Declaration for the Record of Decision

Site Name and Location

City Disposal Corporation Landfill
Dane County, Wisconsin

Statement of Basis and Purpose

This decision document presents the selected remedial action for the City Disposal Corporation Landfill site, in Dane County, Wisconsin, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedy for this site.

The State of Wisconsin has not formally concurred with the selected remedy as of the signature date of this Record of Decision. The Wisconsin Department of Natural Resources (WDNR) is expected to concur with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for this site.

Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The selected remedy addresses the final remedy for the Site and addresses the principal treats posed by the Site.

The major components of the selected remedy include the following:

For ground water:

* Ground-water use restrictions;

* Extraction of ground water followed by treatment of the extracted ground water by chemical oxidation on-site and treated ground water discharge to surface water; and

* Environmental monitoring to ensure effectiveness of the remedial action.

For the landfill contents:

* Resource Conservation and Recovery Act (RCRA) Subtitle D (solid waste) landfill cover over the majority of the site and a Subtitle C (hazardous waste) landfill cover over two areas of the landfill that recieved substantial amounts of industrial waste;

* Landfill gas venting and treatment; and

* In-Situ Vapor Extraction (ISVE) of volatile waste from two cells of the landfill and treatment of the extracted vapors on-site.

Declaration of Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The remedy satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

September 28, 1992
Date

for Valdas V. Adamkus
Regional Administrator

DECISION SUMMARY

A. Site Location and Description

The City Disposal Corporation Landfill (the Site) is located on approximately 38 acres in the southern half of section 30, township 6 North, range 10 East in Dane County, Wisconsin (Figure 1). The landfill is approximately 1/2 mile northeast of Oregon, Wisconsin, approximately 1/2 mile east of Hook Lake and 3-1/2 miles west of Lake Kegonsa. See Figure 1.

The landfill opened in August 1966 and operated until its closure in January 1977. Industrial wastes were disposed there from 1966 to March 1975. The waste is comprised of a mixture of household and industrial waste, general construction waste, and debris. Industrial wastes included solvents from the plastic fabrication industry, mixtures of lubrication oil and water, and paint wastes. These wastes included such substances as xylene, naphtha, cyclohexanone, and tetrahydrofuran.

The landfilled area occupies approximately 24 acres of land. The landfill waste volume is approximately 700,000 cubic yards.

The land surrounding the Site is primarily used for agricultural purposes, and includes minor wooded areas. The Site is bordered to the east by Badfish Creek. The area east of the Site, between Badfish Creek and Sandhill Road, includes residences and a cattle farm. The nearest residences to the Site are those approximately 1,000 feet southwest of the landfill. Residences are also less than 1,500 feet from the eastern limits of the landfill. A wooded section lies southeast of the Site. Pastures and farmland are southwest and west of the Site.

All residences in the area utilize ground water from private drinking water wells. Residential wells close to the Site were sampled during the Remedial Investigation (RI). No contamination from the Site was found in the residential wells sampled.

B. Site History and Enforcement Activities

The landfill was operated by City Disposal Corporation and later by Acme Services, Inc. under a license issued by the Wisconsin Department of Natural Resources subject to State of Wisconsin solid waste management regulations - Chapter NR 151, Wisconsin . Administrative Code (WAC) (NR 151 has subsequently been revised into NR 500). After closure of the Site, both City Disposal Corporation and Acme Services Inc. were acquired by Waste Management of Wisconsin Inc. (WMWI).

FIGURE 1. SITE LOCATION.

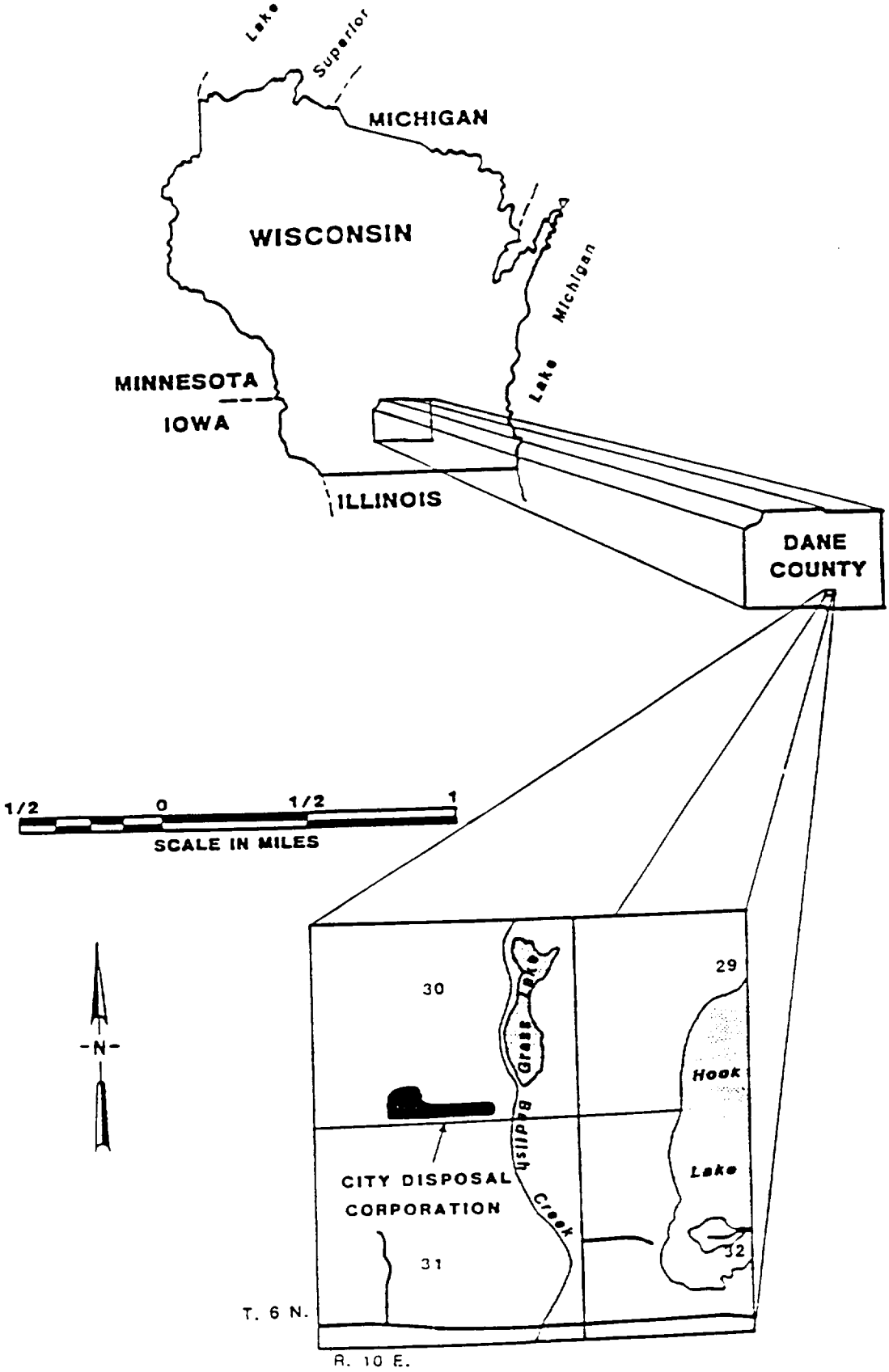


FIGURE 1

The landfill was planned to be subdivided into 12 cells. During operation, Cells 1, 2, 3, 6 and 12 were filled or partially filled with waste. Cells 1 and 12 were used from initial disposal until 1975. Cells 2, 3, 4 and 6 were filled or partially filled from 1974 until closure in 1977. Cells 5 and 7 through 11 were never developed or utilized, except for possible borrowing operations. See Figure 2.

A portion of Cell 12 was designated for industrial waste disposal. Industrial wastes were disposed of in Cell 12 from 1966 through March 1975. Records indicate that drums of liquid wastes were drained into the cell. The liquids were mixed with solid-form waste in the cell. RI ground-water contaminant data suggests that industrial waste may also have been placed in Cell 6.

On June 9, 1981, WMWI submitted a Notification of Hazardous Waste Site pursuant to CERCLA Section 103 (c). The Site was proposed for inclusion on the National Priorities List (NPL) by the WDNR. The Site was placed on the NPL on September 21, 1984.

On August 25, 1987, the United States Environmental Protection Agency (U.S. EPA), WDNR and WMWI entered into an Administrative Order on Consent (AOC) for performance of a Remedial Investigation/Feasibility Study (RI/FS) by WMWI. In August 1988, the following generator Potentially Responsible Parties (PRPs) joined in the RI/FS AOC: Sara Lee Corporation, Graber Industries Inc., Inland Container Corporation, Ohmeda, Sub-Zero Freezer Company, and Webcrafters Inc.

C. Community Participation

The RI and FS Reports and supporting documents were made available to the public in the administrative record maintained at U.S. EPA offices in Region 5 and the Dunn Town Hall (near the Site) at 4156 County Trunk Highway B, McFarland, WI. U.S. EPA's Proposed Plan was mailed to approximately 400 persons on the site mailing list. A notice of availability of the administrative record and Proposed Plan was published in the Wisconsin State Journal, Madison Capital Times, and Stoughton Courier-Hub newspapers on May 14, 1992. Press releases were also sent to all local media. A public comment period on the Proposed Plan and administrative record was held from May 18 to June 18, 1992. In addition, a public meeting was held on June 3, 1992. At this meeting, representatives from U.S. EPA and WDNR answered questions about the Site and the remedial alternatives under consideration. Formal oral comments on the FS and Proposed Plan were also documented by a court reporter. A verbatim transcript of this public meeting has been placed in the information repository and administrative record at the Dunn Town Hall. At the meeting, a request for a comment period extension was made.

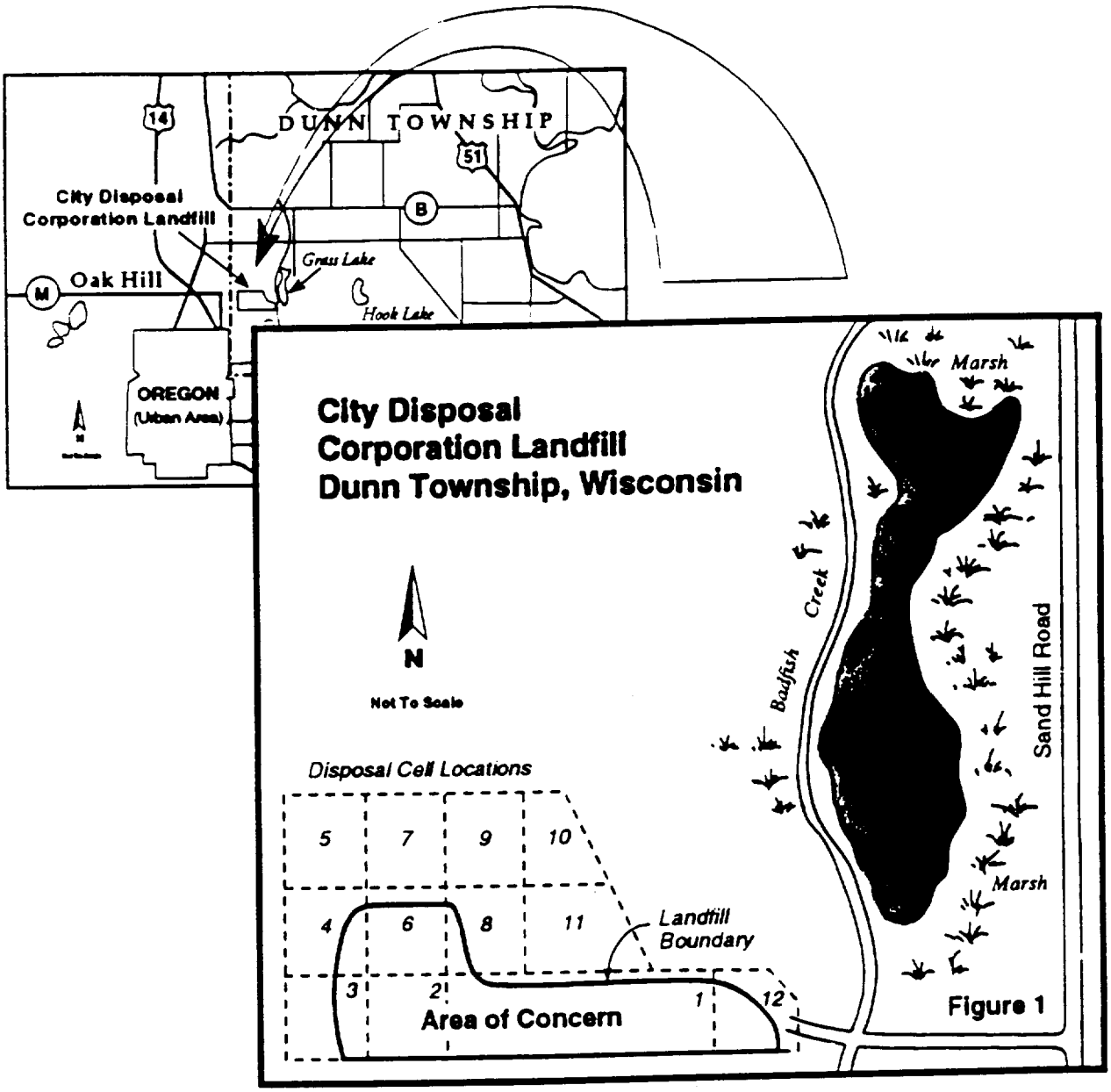

DUNN TOWNSHIP
14
51
B
M
City Disposal
Corporation Landfill
Oak Hill
Grass Lake
Hook Lake
OREGON
(Urban Area)
City Disposal
Corporation Landfill
Dunn Township, Wisconsin
N
Not To Scale
Disposal Cell Locations
5
7
9
10
4
6
8
11
3
2
1
12
Landfill
Boundary
Area of Concern
Marsh
Badfish Creek
Sand Hill Road
Marsh
Figure 1

FIGURE 2

U.S. EPA granted an extension through July 20, 1992. Notice of the extension was published in the Stoughton Courier-Hub and Oregon Observer newspapers on June 11, 1992. Responses to the comments received during the public comment period are included in the Responsiveness Summary, which is part of this ROD.

Prior to the completion of the FS, U.S. EPA conducted additional community relations activities. When the RI was completed, U.S. EPA sponsored a public meeting on December 4, 1991 at the Dunn Town Hall to update the community on its findings. An RI update fact sheet was sent to persons on the mailing list. Notice of this meeting was published in the Madison Capital Times on November 28, 1991 and in the Stoughton Courier-Hub on November 27, 1991. Press releases were also sent to all local media.

U.S. EPA also participated in a Town of Dunn-sponsored informational meeting to update the community on the progress of the RI. This meeting was held on September 26, 1990 at the Dunn Town Hall. A fact sheet was sent in conjunction to this meeting to persons on the mailing list.

U.S. EPA participated in another Town-sponsored update meeting on April 6, 1989 to update the community on the beginning of Spring/Summer fieldwork. A press release was sent to all local media to announce the start of fieldwork at City Disposal (and other Dane County sites) on March 27, 1989.

A press release was sent November 14, 1988 to all local media to announce the start of fall field activities. An RI "kickoff" meeting was held on September 29, 1988 at the Dunn Town Hall. Advertisements were placed in the local newspapers and press releases were sent to all local media. A fact sheet was sent in conjunction to this meeting to all persons on the mailing list.

A press release was also sent to all local media on June 3, 1987 to announce the signing of the consent order.

The information repository was established at the Dunn Town Hall in Summer 1987. The repository has been regularly updated to include monthly reports, applicable laws and other site-related documents.

A Community Relations Plan (CRP) was completed in July 1988. The CRP contains community concerns raised during personal interviews in January 1988. It also outlines a community relations strategy to be followed through completion of the RI/FS.

The public participation requirements of CERCLA Sections 117 and 113 (k)(2)(B)(i-v) have been satisfied.

D. Scope and Role of Response Action Within Site Strategy

This ROD addresses the final remedy for the Site. The threats posed by this Site to human health and the environment are landfilled waste and contaminated ground water.

The landfilled waste is the source material for contamination from the Site. Liquid industrial waste located in landfill cells 6 and 12 are considered a principal threat waste due to their mobility and toxicity. Other wastes placed into the landfill are considered low-level threat wastes.

E. Summary of Site Characteristics

Pursuant to its authority under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), a Remedial Investigation (RI) and Feasibility Study (FS) were conducted at the Site.

The following conditions were observed at the Site:

1. Topography

Landforms in the vicinity of the Site are the result of the action of glaciers, which advanced and retreated across the area, transporting rock and debris. Landforms have been modified by subsequent erosion. The dominant physiographic feature in the area is the Milton Moraine, on which the landfill is located. The Milton Moraine trends northwest throughout the area, is poorly drained, and typically exhibits irregular, hummocky topography with numerous closed depressions, or kettles.

The relief of the land surface is approximately 100 feet in the vicinity of the Site. Elevation varies from around 920 National Geodetic Vertical Datum (NGVD) at Badfish Creek and Grass Lake to approximately 1,020 NGVD north of the landfill. Badfish Creek and Grass Lake are the two predominant surface-water features in the vicinity of the landfill.

The Site lies in the Rock River drainage basin. Surface-water runoff at the Site drains predominantly toward the northeast and east, to Badfish Creek. The Madison sewage treatment plant discharges treated effluent into Badfish Creek at the rate of 24 to 52 million gallons per day, which constitutes the majority of normal flow of the creek. Badfish Creek flows southeast toward the Yahara River, a tributary of the Rock River.

2. Geology

Construction of the landfill occurred within the Milton Moraine. The glacial drift at the landfill was deposited on top of bedrock during periods of advance, stagnation and retreat of glaciers. Two principal glacial deposits are identified at the landfill: (a) a lower basal till consisting of compact, clay-rich, sandy and gravelly deposits that are 0 to 66 feet thick, and (b) overlying the basal till, a series of complex, interbedded, clast-supported diamictons from ice marginal and supraglacial ice-contact and fluvial deposits. Ice marginal and proglacial deposits are developed to the immediate south of the landfill, while englacial and supraglacial deposits predominate north of the landfill's southern-most boundary.

3. Landfill

The waste placed into the landfill was comprised of a mixture of household and industrial waste, general construction waste and debris. Industrial wastes included solvents from the plastic fabrication industry, mixtures of lubrication oil and water, and paint wastes. These wastes included chemicals such as xylene, naphtha, cyclohexanone and tetrahydrofuran.

The landfill was subdivided into 12 cells of which Cells 1, 2, 3, 6 and 12 were filled or partially filled with waste. Cells 5 and 7 through 11 were never developed or utilized, except for possible borrowing operations.

A portion of Cell 12 was designated for industrial waste disposal. Industrial waste arrived at the landfill in drums. The drums were staged near the edge of Cell 12, the bungs were removed and the drums then laid into the open cell to drain. Refuse was then placed in Cell 12, mixed with the liquids and drums and compacted. Discrete areas of concentrations of disposed drums were not found during the investigation. Records indicate that empty drums were also placed into Cell 6 after their contents were drained into Cell 12. No records of drum stacking or drum trenching activities have been found.

The existing landfill cover consists of soil and varies in thickness and composition. The construction of the existing landfill cover is inadequate for long-term minimization of

the movement of water from the surface into the landfilled waste.

The thickness of the cover ranges from 0.5 foot to 4.2 feet at points sampled. The mean value of the thickness of the cover at the sampling points is 1.7 feet. The cover is absent at several points at which exposed waste was observed. Samples of the cover soil were collected from several points on the cover. The cover does not comply with current solid waste and hazardous waste landfill closure requirements.

The thickness of the waste ranges from 15.0 feet to 22.7 feet. The waste mass within the landfill is above the water table. The water table lies between 5 and 20 feet below the waste.

Leachate was not found within the landfill. It appears that the bottom of the landfill does not prevent downward movement of liquid or leachate. Results of the investigation suggest that the chemical character of absorbed moisture in the waste in Cell 12 is different than that of other cells. This suggests that some of the industrial waste placed into the cell remain absorbed in the waste of the cell.

4. Contamination

Contamination at the Site results from the source material (landfilled waste) and impacts both ground water and soils.

a. Source.

The source of contamination from this site is the landfilled waste. The landfill lacks a bottom liner system to prevent liquid waste and landfill-produced leachate from moving downward from the waste into the ground water.

Investigation data indicate that liquid industrial waste placed in Cell 12 appears to be absorbed into the solid-form waste and continues to be a source for ground-water contamination. The source of the majority of ground-water contamination appears to be Cells 6 and 12. This indicates that the solid-form waste in Cell 6 has also absorbed liquid industrial waste or that liquid waste was also disposed there and continues to be a significant source of ground-water contamination.

The investigation data indicates that a number of Volatile Organic Compounds (VOCs) were disposed in the

landfill. These VOCs include Benzene, Methylene chloride, 2-Butanone, Tetrachloroethylene, Tetrahydrofuran, Toluene, Trichloroethylene, Vinyl Chloride, Xylene, Dichloroethane and Dichloroethylene.

The investigation data indicate that the solid waste placed in the landfill is not producing significant amounts of methane gas. Low concentrations of total volatiles were sporadically detected around the periphery of the landfill.

b. Ground Water.

Aquifers beneath the Site consist of two systems: Glacial Deposits and Bedrock.

i. Glacial Deposits. The landfill has contaminated ground water contained in the glacial deposits around the landfill. Ground-water wells installed to monitor the glacial deposits are designated as Shallow and Intermediate (S&I) wells.

Table 1 summarizes the chemicals and concentrations found in the glacial deposits aquifer.

Movement of ground water within this aquifer is complex, due to the variability of the glacial deposits, and the flow of ground water from Badfish Creek toward the Site. The dominant directions of movement of ground water are northeast under the eastern portion of the landfill, and predominantly northward under the western portion of the landfill. There is a north-south trending ground-water divide in the eastern portion of the landfill, west of Cell 12. Figure 3 illustrates the direction of ground-water movement in the glacial deposits.

Horizontal ground-water gradients are very small in value. Ground-water velocities vary around the Site. Velocities range from 8.3 to 380.8 feet per year. The mean velocity of ground water is very slow.

Investigation data indicates a ground-water depression northeast of the Site.

TABLE 1

SUMMARY OF CHEMICALS DETECTED IN GROUNDWATER
AT CITY DISPOSAL CORPORATION LANDFILL
SHALLOW AND INTERMEDIATE WELLS
(Concentrations reported in ug/L)

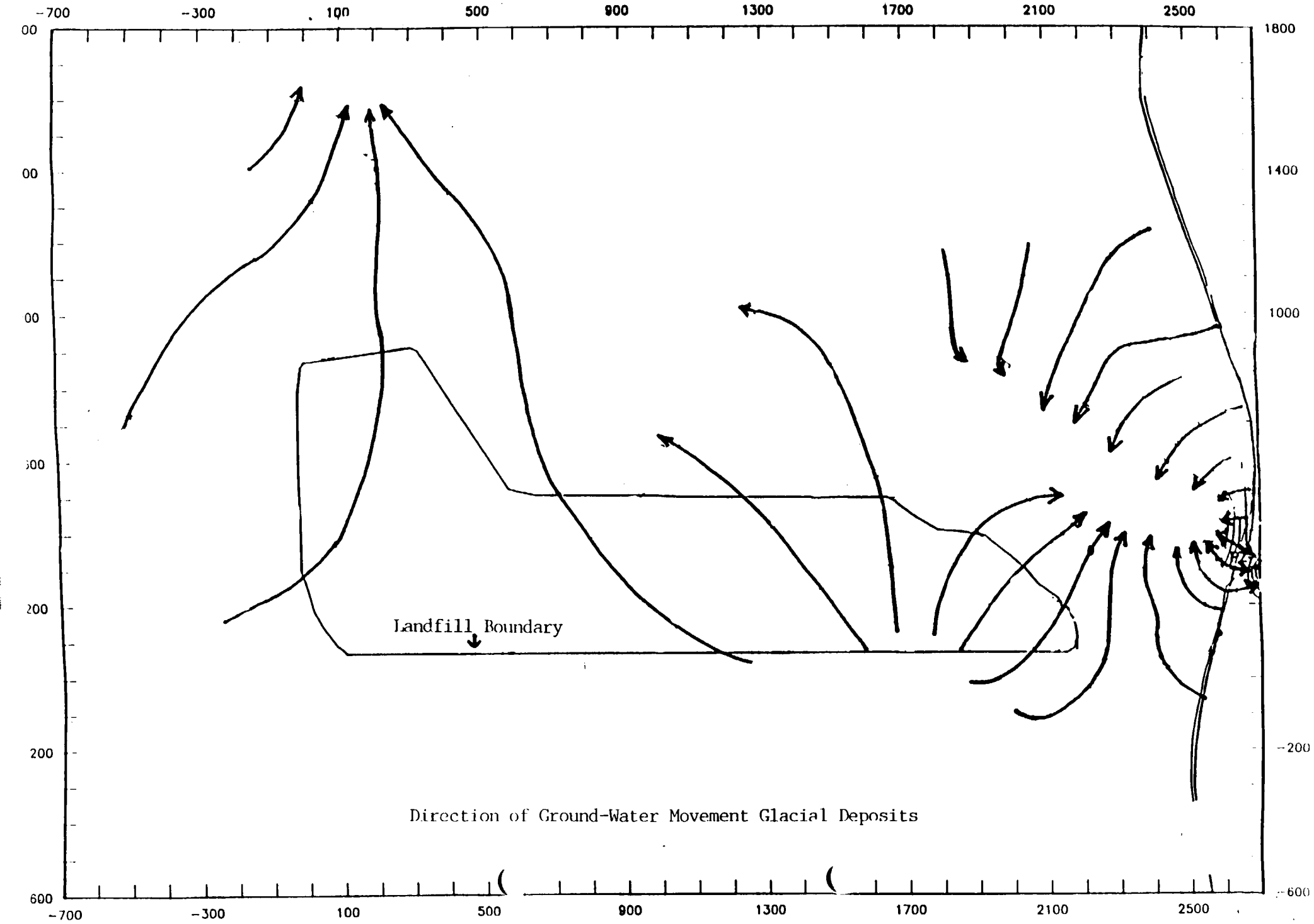
CHEMICAL ORGANICS:	Frequency of Detection (a)	Range of Detected On-Site Concentrations	Range of RI Background Concentration (f)
Acetone	38/53	3.1 - 102,650	5.7 - 10
Benzene	18/41	1.5 - 8.8	ND
Benzoic Acid	3/17	10.6 - 294.5	ND
2-Butanone[1]	10/41	44.2 - 622,500	ND
Carbon Tetrachloride	1/41	162.8	ND
Chloroethane	12/41	3.2 - 33.5	ND
1,1-Dichloroethane	18/44	1.8 - 249.5	ND
1,2-Dichloroethane	1/41	1,306.3	ND
trans-1,2-Dichloroethene	21/43	1.9 - 1,646.3	ND
1,2-Dichloropropane	7/41	1.4 - 2.7	ND
Diethylphthalate	1/17	4.1	ND
Ethylbenzene	13/41	1.5 - 1,070	ND
2-Hexanone	2/41	7.4 - 8.6	ND
Isophorone	1/17	1.9	ND
4-Methyl-2-pentanone	13/48	1.4 - 3,400	ND
Methylene Chloride	39/51	1 - 767	1.7 - 6.8
2-Methylphenol	2/17	3.6 - 21	ND
4-Methylphenol	5/17	2.1 - 253	ND
Naphthalene	1/17	18	ND
Phenol	3/17	1.5 - 48	ND
1,1,2,2-Tetrachloroethane	2/48	1.2	ND
Tetrachloroethene	16/44	0.8 - 119	ND
Tetrahydrofuran	23/42	16.3 - 199,500	ND
Toluene	17/46	0.9 - 25,900	ND
1,1,1-Trichloroethane	10/44	0.9 - 17.5	ND
Trichloroethene	23/46	1.4 - 277	ND
Vinyl Acetate	1/41	3.9	ND
Vinyl Chloride	4/41	1.5 - 1,250	ND
m-Xylene	10/41	1.7 - 1,790	ND
o&p-Xylene	14/41	1.6 - 1,880	ND

[1] Also known as Methyl Ethyl Ketone (MEK)

TABLE 1 con't
SUMMARY OF CHEMICALS DETECTED IN GROUNDWATER
AT CITY DISPOSAL CORPORATION LANDFILL
SHALLOW AND INTERMEDIATE WELLS
(Concentrations reported in ug/L)

CHEMICAL Inorganics:	Frequency of Detection (a)	Range of Detected On-Site Concentrations	Range of RI Background Concentration (f)
Aluminum	1/17	37	ND
Arsenic	10/17	2.8 - 63	8.2 - 9.6
Barium	19/20	11 - 670	51 - 260
Beryllium	10/20	0.3 - 0.4	0.3
Boron	20/20	5.7 - 280	28 - 89
Cadmium	13/20	0.5 - 4.4	1.6 - 2.1
Calcium	53/53	44000 - 280,000	68,000 - 104,000
Chloride	53/53	2400 - 208,700	4,400 - 35,900
Chromium	6/20	1.3 - 2.5	ND
Cobalt	6/17	7.3 - 27	ND
Copper	18/20	2 - 13	5 - 6.9
Cyanide	19/19	0.3 - 3.1	1.3 - 3.2
Fluoride	50/53	100 - 500	100 - 500
Iron	43/53	22 - 52,900	93 - 6,400
Lead	4/17	1 - 1.5	ND
Magnesium	53/53	5,600 - 132,000	33,00 - 55,200
Manganese	50/53	3.3 - 3,700	17 - 1,090
Nickel	11/17	3.4 - 34	4.3 - 6.6
Nitrate	9/20	200 - 17,650	300
Potassium	45/53	520 - 12,000	1,500 - 4,100
Selenium	1/17	0.6	1.3
Silver	12/20	2.6 - 9.3	3 - 5.3
Sodium	53/53	2,400 - 62,000	3,000 - 17,000
Sulfate	12/12	5,790 - 28,800	12,000 - 50,900
Vanadium	13/20	4.6 - 18.5	10
Zinc	13/20	7.8 - 140	11 - 20

FIGURE 3


-700
-300
100
500
900
1300
1700
2100
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1800
1400
1000
-200
-600
Landfill Boundary
Direction of Ground-Water Movement Glacial Deposits

It appears that this low is an expression of near stagnation of ground-water movement that results from ground-water flow from two opposing directions (from the southwest and the northeast).

ii. Bedrock Aquifer. The landfill has contaminated ground water in the bedrock. Ground-water wells installed to monitor the bedrock are designated as bedrock wells.

Table 2 summarizes the chemicals and concentrations found in the bedrock aquifer.

The direction of ground-water movement in the bedrock aquifer is, in general, toward the north.

The potentiometric surface of the bedrock aquifer is generally lower in elevation relative to the glacial deposits aquifer. There is no significant consistent aquitard preventing ground-water movement from the glacial deposits aquifer down into the bedrock aquifer. Ground-water contamination in the glacial deposits moves into the bedrock aquifer.

iii. Private Wells. Water samples from private wells near the Site were collected and analyzed. Site related contaminants were not found in the private wells tested.

The known area of ground-water contamination is indicated on Figure 4. Additional data will be necessary to delineate the total extent of the ground-water contamination.

c. Soils

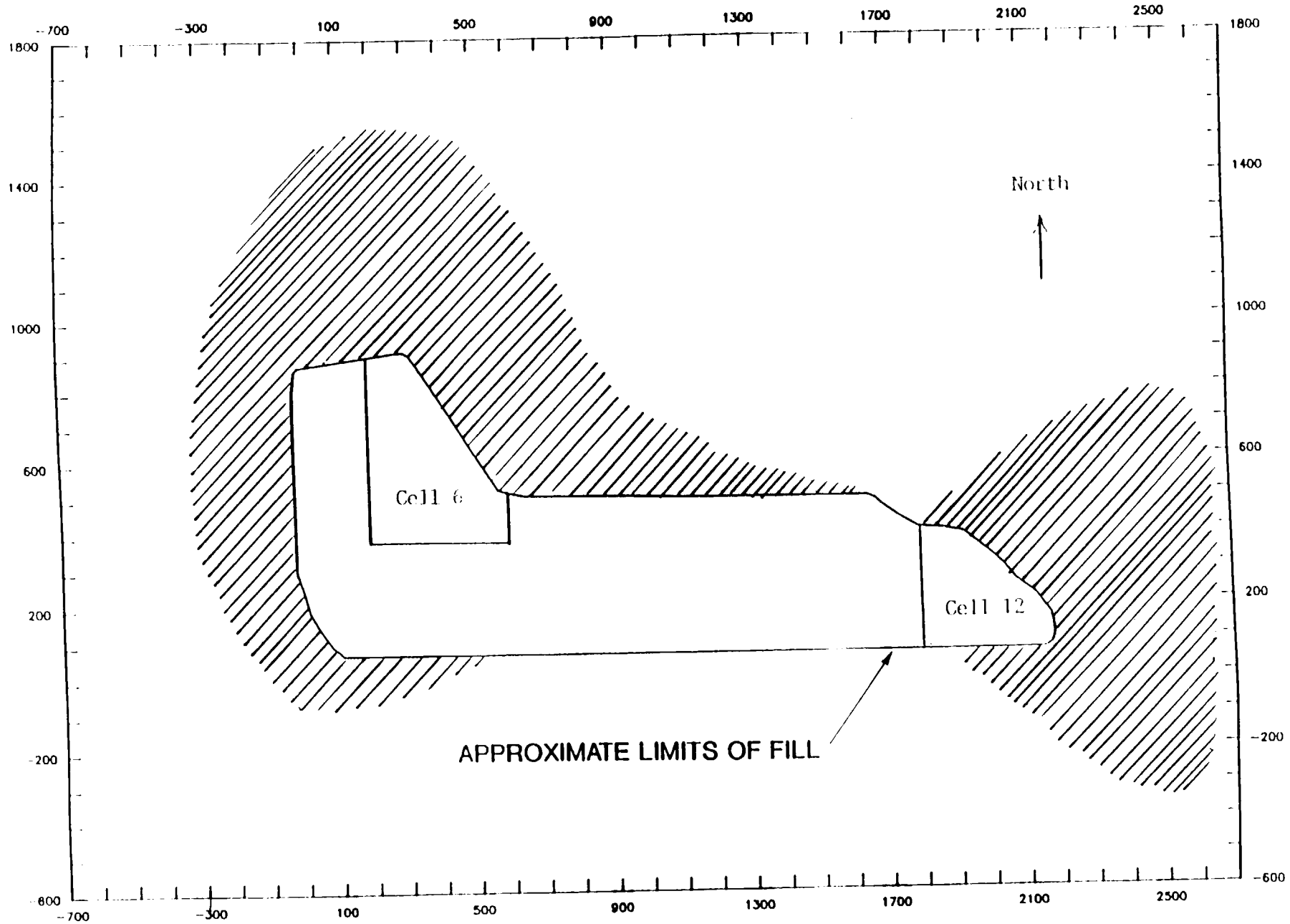
Surficial soil samples were collected and analyzed from on and around the landfill. VOCs were found at downslope locations from the landfill and at isolated locations on the landfill surface. Transport of contaminated soils is very limited due to the significant vegetation of the Site.

TABLE 2

SUMMARY OF CHEMICALS DETECTED IN GROUNDWATER
AT CITY DISPOSAL CORPORATION LANDFILL
BEDROCK WELLS
(Concentrations reported in ug/L)

Chemicals Organics:	Freqency of Detection(a)	Range of Detected On-Site Concentrations	Range of RI Background Concentrations (d)
Acetone	4/8	4 - 24.5	ND
Chlorobenzene	1/4	1	ND
1,1-Dichloroethane	2/8	0.7 - 6.3	ND
trans-1,2-Dichloroethene	3/8	13.7 - 84.1	ND
2-Hexanone	1/4	4.6	ND
4-Methyl-2-pentanone	1/4	5.5	ND
Methylene Chloride	6/8	1.9 - 4.6	ND - 12.6
1,1,2,2-Tetrachloroethane	1/4	2.8	ND
Tetrachloroethene	1/4	8	ND
Tetrahydrofuran	3/4	12.3 - 53.5	ND
Toluene	1/4	0.9	ND
1,1,1-Trichloroethane	1/4	3.2	ND
Trichloroethene	5/4	2.1 - 74.2	ND
o&p-Xylene	1/4	1.1	ND
Inorganics:			
Barium	3/3	24 - 73	110
Beryllium	1/2	0.2	ND
Boron	3/3	8.3 - 37	40
Cadmium	2/2	0.9 - 1.1	ND
Calcium	8/8	63,400 - 120,000	78,700 - 81,000
Chloride	7/8	2,600 - 9,100	42,800 - 81,000
Chromium	1/2	2.5	ND
Copper	3/3	2 - 3.2	ND
Cyanide	3/3	0.1 - 0.7	0.6
Fluoride	8/8	100 - 200	100
Iron	6/8	34.5 - 1,400	ND
Magnesium	8/8	31,000 - 59,000	39,000 - 42,200
Manganese	7/8	2.7 - 94	2.3
Nitrate	1/2	700	8,700
Potassium	6/8	780 - 2,200	1,800
Selenium	1/2	1.4	ND
Sodium	8/8	3,000 - 4,200	18,000 - 21,000
Sulfate	8/8	23,000 - 31,000	25,300 - 26,000
Vanadium	1/2	5.9	ND
Zinc	3/3	13 - 31	16

FIGURE 4



Approximate Area of Known Ground-Water Contamination

F. Summary of Site Risks

Pursuant to the NCP, a baseline risk assessment was performed based on the present condition of the Site. The baseline risk assessment assumes no corrective action will take place and that no site-use restrictions or institutional controls such as fencing, ground-water use restrictions or construction restrictions will be imposed. The risk assessment then determines actual or potential risks the chemical contaminants at the Site pose under current and future land use assumptions. The first step of the risk assessment was to select chemicals, or contaminants of potential concern. Subsequent steps include identifying ways that humans might be exposed to the site contaminants and calculating the potential risks.

1. Contaminant Identification

The media of concern for human exposures were identified primarily as ground water and soils. As stated earlier, waste disposed of at the landfill has caused significant ground-water contamination and isolated areas of soil contamination.

The contaminants of concern selected for risk characterization in ground water were:

Acetone	Benzene	Benzoic acid
2-Butanone*	Carbon Tetrachloride	Chlorobenzene
Chloroethane	1,1-Dichloroethane	1,2-Dichloroethane
trans-1,2-Dichloroethene		
1,2-Dichloropropane	Diethylphthalate	Ethylbenzene
2-Hexnone	Isophorone	4-Methyl-2-pentanone
Methylene chloride	2-Methylphenol	4-Methylphenol
Naphthalene	Phenol	1,1,2,2-Tetrachloroethane
Tetrachloroethene	Tetrahydrofuran	Toluene
1,1,1-Trichloroethane	Trichloroethene	Vinyl Acetate
Vinyl Chloride	m-Xylene	o&p-Xylenes
Beryllium	Cadmium	Calcium
Chloride	Chromium	Cobalt
Copper	Cyanide	Fluoride
Iron	Lead	Magnesium
Manganese	Nickel	Nitrate
Potassium	Selenium	Silver
Sodium	Sulfate	Vanadium
Zinc		

* - Note: 2-Butanone is also commonly called Methylethylketone (MEK).

The contaminants of concern selected for risk characterization from surface soils were:

Acetone	Benzoic acid	bis(2-Etyylhexyl)phthalate
Butylbenzylphthalate	Di-n-Butylphthalate	Di-n-octylphthalate
Dibenzofuran	Ethylbenzene	Fluorene
2-Methylnaphthalene	Naphthalene	Phenol
Tetrahydrofuran	Toluene	m-Xylene
o&p-Xylenes	Aluminum	Antimony
Arsenic	Barium	Beryllium
Boron	Cadmium	Calcium
Chromium	Cobalt	Copper
Cyanide	Iron	Lead
Magnesium	Manganese	Mercury
Nickel	Potassium	Silver
Sodium	Vanadium	Zinc

2. Exposure Assessment

The baseline risk assessment examined potential pathways of concern to human health under both current and future landfill property and surrounding land-use scenarios.

The following pathways were selected for detailed evaluation under current-use conditions:

- Inhalation of VOCs emitted from the landfill by trespassers on the Site for two receptor populations (children/teenagers and adults),
- Inhalation of VOCs emitted from the landfill by nearby residents,
- Incidental ingestion of surface soil by trespassers on the Site,
- Dermal absorption of surface soil by trespassers on the Site,
- Incidental ingestion of surface soil by nearby residents,
- Ingestion of ground water by nearby residents, and
- Inhalation of VOCs while showering by nearby residents.

The following pathways were selected for detailed evaluation under future-use conditions:

- Inhalation of VOCs emitted from the landfill by a hypothetical future resident on landfill property,
- Incidental ingestion of surface soils by a hypothetical future resident on landfill property,
- Dermal absorption of surface soils by a hypothetical future resident on landfill property,
- Ingestion of ground water by a hypothetical future resident on landfill property,
- Inhalation of VOCs by a hypothetical future resident on landfill property while showering, and
- Ingestion of dairy milk by residents from cattle grazing on landfill property and consuming landfill property ground water.

3. Risk Characterization

For each of the potential receptors, the risks associated with ingestion, inhalation and dermal absorption to the site-specific contaminants from different routes of exposure were evaluated. Both non-carcinogenic and carcinogenic health effects were also estimated.

Reference doses (RfDs) have been developed by U.S. EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

Potential concern for non-carcinogenic effects of a single contaminant in a single medium is expressed as the Hazard Quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the

contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. Any HI value greater than 1.0 suggests that a non-carcinogen potentially presents an unacceptable health risk.

Cancer Potency Factors (CPFs) have been developed by U.S. EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. CPFs are derived from the results of human epidemiological studies or chronic animal bioassay to which animal-to-human extrapolation and uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans).

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor for each contaminant of concern. These risks are probabilities that are generally expressed in scientific notation (e.g. 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

U.S. EPA generally attempts to reduce the excess lifetime cancer risk posed by Superfund sites to a range of 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in 1 million), with an emphasis on the lower end, 1×10^{-6}, of the scale.

When a baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds the 1×10^{-4} lifetime excess cancer risk end of the range, action under CERCLA is generally warranted at the site.

Table 3 summaries the excess lifetime cancer risks and HI for the current land-use scenario. Table 4 summaries the excess lifetime cancer risks and HI for the future land-use scenario.

TABLE 3
SUMMARY OF POTENTIAL HEALTH RISKS ASSOCIATED WITH
THE CITY DISPOSAL CORPORATION LANDFILL SITE
CURRENT LAND USE CONDITIONS

Exposure Pathway	Upper Bound Excess Lifetime Cancer Risk[a]	Hazard Index for Noncarcinogenic Effects[b]
Inhalation of Landfill Emissions	—	<1
Landfill Property Child/Teenage Trespassers	—	<1
Landfill Property Adult Trespassers	—	<1
-Nearby Residents		
Surface Soil Ingestion		
Landfill Property Child/Teenage Trespassers	$5X10^{-8}$	<1
Landfill Property Adult Trespassers	$4X10^{-8}$	<1
-Nearby Residents	$1X10^{-8}$	<1
Dermal Absorption from Surface Soil	$4X10^{-11}$	<1
Landfill Property Child/Teenage Trespassers	$1X10^{-10}$	<1
Landfill Property Adult Trespassers	—	<1
-Nearby Residents		
Groundwater Ingestion		
- S&I North Downgradient	$4X10^{-6}$	<1
- S&I Northeast Downgradient	$4X10^{-6}$	<1
- Bedrock Downgradient	$2X10^{-5}$	>1
- Residential Wells		
	$2X10^{-5}$	<1
		<1
		<1
		<1
Inhalation of VOCs While Showering		
- S&I North Downgradient	$3X10^{-7}$	<1
- S&I Northeast Downgradient	$1X10^{-6}$	<1
- Bedrock Downgradient	$6X10^{-6}$	<1

[a] The upper bound individual excess lifetime cancer risk represents the additional probability that an individual may develop cancer over a 70-year lifetime as a result of the exposure conditions evaluated.

[b] The hazard index indicates whether or not exposure to mixtures of noncarcinogenic chemicals may result in adverse health effects.

— = Not applicable. Chemicals of potential concern for this pathway do not exhibit carcinogenic effects.

TABLE 4

SUMMARY OF POTENTIAL HEALTH RISKS ASSOCIATED WITH
THE CITY DISPOSAL CORPORATION LANDFILL SITE
FUTURE LAND USE CONDITIONS

Exposure Pathway	Upper Bound Excess Lifetime Cancer Risk[a]	Hazard Index for Noncarcinogenic Effects[b]
Inhalation of Landfill Emissions Landfill Property Resident	—	<1
Ingestion of Surface Soil Landfill Proerty Resident	$4X10^{-6}$	<1
Dermal Absorption from Surface Soil Landfill Property Resident	$8X10^{-10}$	<1
Ingestion of Groundwater Landfill Property S&I Wells Landfill Property Bedrock Wells	$2X10^{-2}$ $1X10^{-5}$	>1 <1
Inhalation of VOCs While Showering Landfill Property S&I Wells Landfill Property Bedrock Wells	$2X10^{-3}$ $8X10^{-7}$	>1 <1
Ingestion of Dairy Milk Landfill Property Resident	$2X10^{-6}$	<1

[a] The upper bound individual excess lifetime cancer risk represents the additonal probability that an individual may develop cancer over a 70-year lifetime as a result of the exposure conditions evaluated.

[b] The hazard index indicates whether or not exposure to mixtures of noncarcinogenic chemicals may result in adverse health effects.

-- = Not applicable. Chemical of potential concern for this pathway do not exhibit carcinogenic effects.

4. Risk Summary

The HIs for humans interacting with the Site exceed the acceptable hazard index of 1.0, principally from the use of contaminated ground water under current and future-use scenarios. This represents unacceptable potential risks to human health.

The potential excess lifetime cancer risk posed by the Site exceeds the acceptable risk range of 1×10^{-4} to 1×10^{-6} principally from the use of contaminated ground water under the future use scenario. This represents unacceptable potential risks to human health.

5. Environmental Risks

An ecological risk assessment was conducted to evaluate potential impacts on nonhuman receptors associated with the Site. This evaluation involved the identification of potential receptors and exposure pathways, including determination of the presence of endangered or threatened species in the area.

Absolute conclusions regarding the potential environmental impacts of the Site cannot be made because there are many uncertainties surrounding the estimates of toxicity and exposure for these organisms. The risk assessment concluded that, based on the available data and limitations, no adverse effects to plants, soil organisms and livestock are expected.

Based on available information from the U.S. Fish and Wildlife Service, endangered species which may occur in Dane County will not be adversely affected by the Site. Finally, according to the Wisconsin Wetland Inventory map, there are no wetlands identified on the landfill property.

H. Rationale for Further Action

Actual or threatened releases of hazardous substances from this site, if not addressed by implementation of the response action selected by this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. Therefore, based on the findings in the RI report and the discussion above, a Feasibility Study (FS) was performed to focus on the development of alternatives to address the threats at the Site. The FS report documents the evaluation of the magnitude of site risks, site-specific applicable or relevant and appropriate

requirements, and the requirements of CERCLA and the NCP in the derivation of remedial alternatives for the Site.

I. Description of Alternatives

The remedies for environmental contamination resulting from the landfill can best be described by discussing remedies for addressing the landfilled waste (source of contamination at the Site) and remedies for addressing contaminated ground water at the Site.

Source Control Alternatives

The purpose of the source control portion of the final remedy is to minimize the migration of hazardous substances into other environmental media and to eliminate exposure pathways to the public. The FS Report described a detailed analysis of four source control alternatives. The Proposed Plan identified these alternatives as S1, S2, S3 and S4[1].

All four source control alternatives, including S1 the "No-Action" Alternative, employ a network of active gas extraction trenches over the entire landfill to control landfill gas. Chapter NR 506.08 WAC requires active landfill gas control at landfills with waste volumes greater than 500,000 cubic yards. The active gas extraction trench system could be designed as a network of buried slotted pipes, with gravel backfill beneath the landfill cap designed to conduct landfill gas to flares on the landfill. A blower could be used to produce a vacuum on the system to actively remove landfill gas. The collected landfill gas could be flared to achieve air emission standards of Chapters NR 400-499 WAC and the Federal Clean Air Act, 42 U.S.C.A. Sections 7401 to 7642.

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[1] The Proposed Plan titles for alternatives differ from the Feasibility Study Report titles for the same alternatives. The alternatives relate as follows:

Proposed Plan Alternatives	Feasibility Study Report Alternatives
S1	I
S2	V
S3	VI
S4	VII
GW1	0
GW2	7
GW3	8
GW4	9
GW5	10

The first source control alternative, S1, is known as a "no-action" alternative which generally employs no measures, other than the required landfill gas control measure previously described, to address the landfill contents. The remaining three source control alternatives S2, S3 and S4 include measures to address the landfill contents.

Alternatives S2, S3 and S4 include elements to address the landfill contents that are common to each of the three alternatives. All three alternatives include:

- nstitutional controls, including deed restrictions miting the land use of the landfill and landfill perty.

- An in-situ vapor extraction and treatment system to remove and treat VOCs from the two areas within the landfill that contain significant amounts of liquid industrial wastes, cells 6 and 12. This system would remove and destroy significant amounts of contaminants from the waste mass preventing their eventual migration into the environment.

  This system would be comprised of vent wells drilled into the landfilled waste in Cells 6 and 12. The vent wells would be connected to header pipes. The header pipes would be connected to a blower to produce a vacuum on the vent wells.

  The extracted vapors would be treated to achieve air emission standards of Chapters NR 400-499 WAC and the Federal Clean Air Act by flaring.

- An air intrusion cut-off wall would be constructed to reduce the amount of air being drawn laterally into Cells 6 and 12 during operation of the vapor extraction system. This cut-off wall would control air movement through the waste reducing the possibility of uncontrolled oxidation of the waste.

  This cut-off wall would be comprised of a geomembrane anchored into the landfill cover for Cells 6 and 12 and extending into a 6-foot deep trench excavated around the perimeter of the two cells.

The difference between S2, S3 and S4 is the type of landfill cover that would be utilized.

The purpose of a landfill cover is to reduce the amount of precipitated water that migrates down through landfilled waste. Water migrating down through waste leaches hazardous constituents from the waste and carries these constituents out of the landfill and into soils, surface waters and ground waters.

Two of the major potential Applicable or Relevant and Appropriate Requirements (ARARs) for the landfill cover portion of the source control alternatives are Chapter NR 504.07 WAC (solid waste landfill cover requirements) and Chapter NR 660.16 WAC (hazardous waste landfill cover requirements). Resource Conservation and Recovery Act (RCRA) Subtitles C and D include landfill cover requirements. RCRA Subtitle C regulates hazardous waste management and Subtitle D regulates solid waste management. The State of Wisconsin is currently authorized to fully administer RCRA Subtitles C and D within the state. Therefore, the State of Wisconsin's promulgated RCRA requirements replace equivalent or less stringent federal requirements as potential ARARs. Wisconsin has promulgated regulations governing the subject matter of RCRA Subtitle C and D - Chapter NR 600 WAC addressing hazardous waste management, and Chapter NR 500 WAC addressing solid waste management.

The landfill contains wastes that are similar or identical to RCRA solid wastes. These solid wastes will continue to be managed at the landfill. Therefore, Chapter NR 504.07 WAC requirements on the closure of the entire landfill are both relevant and appropriate.

The landfill ceased accepting waste for disposal in 1977 before the 1980 effective date of hazardous waste management requirements under RCRA Subtitle C. Therefore, Chapter NR 660.16 WAC requirements are not applicable. The landfill, however, does contain industrial wastes that are similar or identical to RCRA hazardous waste. Therefore, Chapter NR 660.16 WAC requirements are relevant. Site investigation data indicates that the majority of the industrial waste was placed into Cells 6 and 12. Based on investigation data that suggests that the majority of the VOCs in ground water are being released from Cells 6 and 12, U.S. EPA has determined that the landfill closure requirements of Chapter NR 600 WAC are appropriate for Cells 6 and 12. Therefore, the hazardous waste landfill closure requirements of Chapter NR 660.16 WAC are relevant and appropriate for Cells 6 and 12.

Alternative S1

Alternative S1 is comprised of Active Gas Extraction Trenches as, previously described, with no other action to be taken.

The installation of the Active Gas Extraction Trenches would take 6 weeks.

Assuming some soil materials can be obtained from landfill property, the estimated number of 10-cubic-yard truckloads of material needed to be transported to the Site is 80.

The estimated costs for this alternative are:
Capital cost: $366,000,
Operation and Maintenance (O&M) annual costs:
$42,500 for each of the first 2 years
$10,200 per year an additional 28 years,
Net Present Value of Capital and O&M costs: $587,700.

Alternative S2

Alternative S2 includes the common "source control" elements previously described and utilizes Landfill Cover Design A over the entire landfill. A cross section of the proposed landfill cover design is included on Figure 5. This cover design does not comply with Chapter NR 504.07 WAC (solid waste landfill cover requirements) or Chapter NR 660.16 WAC (hazardous waste landfill cover requirements).

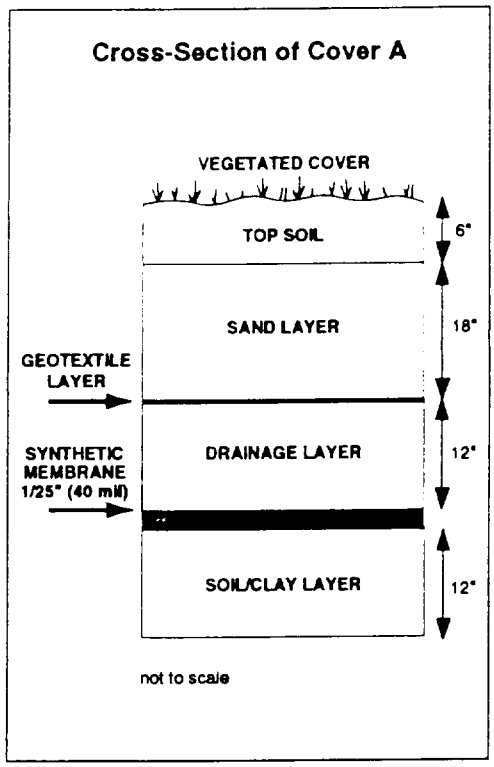
Chapters NR 504 and NR 660 WAC require that final solid waste and hazardous waste landfill cover designs include a clay capping layer that is a minimum of 24 inches thick with a permeability of 1×10^{-7} cm/sec or less. Alternative S2 does not include this 24-inch clay layer.

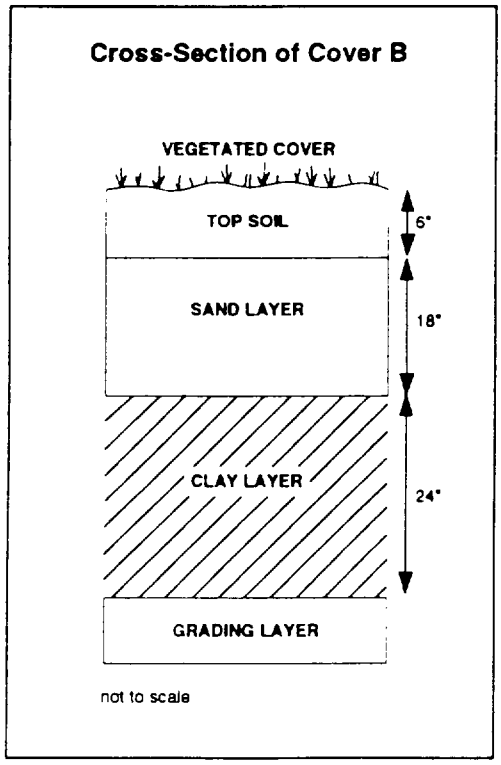
The estimated construction time for this alternative is 4 months. The estimated length of time that the in-situ vapor extraction and treatment system would be operated is 5 years.

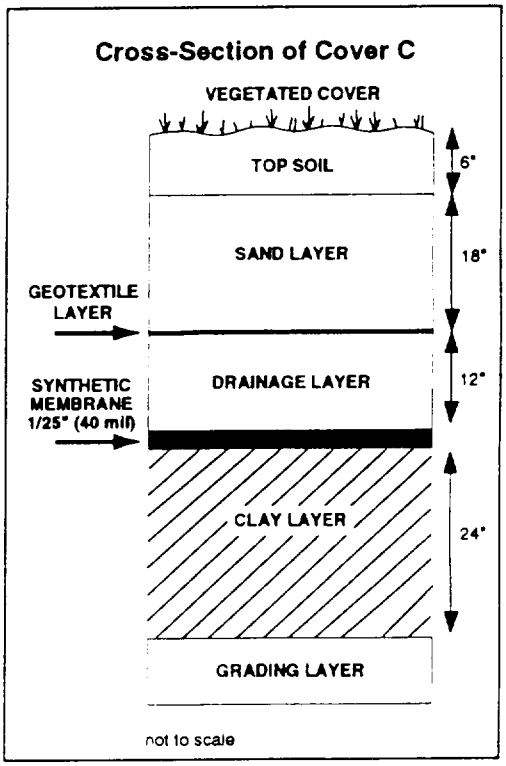
Assuming some soil materials can be obtained from landfill property, the estimated number of 10-cubic-yard truckloads of material needed to be transported to the Site is 10,027.

The estimated costs for this alternative are:
Capital cost: $3,359,030,
O&M annual costs:
$90,978 for each of the first 5 years
$21,258 per year for an additional 25 years,
Net Present Value of Capital and O&M costs: $3,905,226

FIGURE 5


Cross-Section of Cover A
VEGETATED COVER
TOP SOIL
6"
SAND LAYER
18"
GEOTEXTILE LAYER
SYNTHETIC MEMBRANE 1/25" (40 mil)
DRAINAGE LAYER
12"
SOIL/CLAY LAYER
12"
not to scale


Cross-Section of Cover B
VEGETATED COVER
TOP SOIL
6"
SAND LAYER
18"
CLAY LAYER
24"
GRADING LAYER
not to scale


Cross-Section of Cover C
VEGETATED COVER
TOP SOIL
6"
SAND LAYER
18"
GEOTEXTILE LAYER
SYNTHETIC MEMBRANE 1/25" (40 mil)
DRAINAGE LAYER
12"
CLAY LAYER
24"
GRADING LAYER
not to scale

Alternative S3

Alternative S3 includes the common source control elements described above and utilizes Landfill Cover Design B (solid waste landfill cover) over the majority of the landfill and in addition Landfill Cover Design C (hazardous waste landfill cover) over Cells 6 and 12. Cross sections of the designs are included on Figure 5. Both designs comply with NR 504.07 (state solid waste landfill cover requirements). Landfill Cover Design C (for Cells 6 and 12) complies with Chapter NR 660.16 WAC (hazardous waste landfill cover requirements).

The estimated construction time for this alternative is 6 months. The estimated length of time that the in-situ vapor extraction and treatment system would be operated is 5 years.

Assuming some soil materials can be obtained from landfill property, the estimated number of 10-cubic-yard truckloads of material needed to be transported to the Site is 12,692.

The estimated costs for this alternative are:

Capital cost: $3,379,566,
O&M annual costs:
$90,978 for each of the first 5 years
$21,258 per year for an additional 25 years,
Net Present Value of Capital and O&M costs: $3,925,008

Alternative S4

Alternative S4 includes the common source control elements described above and utilizes Landfill Cover Design B (solid waste landfill cover) over the entire landfill. A schematic of Landfill Cover Design B is included on Figure 5. This cover design complies with Chapter NR 504.07 WAC (solid waste landfill cover requirements), but does not comply with Chapter NR 660.16 WAC (hazardous waste landfill requirements) for the portion of the cover over Cells 6 and 12.

The estimated construction time for this alternative is 4 months. The estimated length of time that the in-situ vapor extraction and treatment system would be operated is 5 years.

Assuming some soil materials can be obtained from landfill property, the estimated number of 10-cubic-yard truckloads of material needed to be transported to the Site is 11,982.

The estimated costs for this alternative are:
Capital cost: $3,060,057,
O&M annual costs:
$90,978 for each of the first 5 years
$21,258 per year for an additional 25 years,
Net Present Value of Capital and O&M costs: $3,617,224

Ground-Water Alternatives

The purpose of the ground-water portion of the final remedy is to return usable ground water at the Site to its beneficial use, as an actual or potential ground-water source, within a reasonable time. The FS Report described a detailed analysis of five ground-water alternatives. The Proposed Plan identified these alternatives as GW1, GW2, GW3, GW4 and GW5.

Contaminated ground water will be returned to its beneficial use when the concentrations of ground water meets the ground-water cleanup standards set by this ROD. The ground-water cleanup standards are the Preventive Action Limits (PALs) established in NR 140 WAC. The ground-water cleanup standards of NR 140 WAC are ARARs for the ground-water cleanup. These ground-water cleanup standards are listed in Table 5.

The location of the point of compliance for the ground-water cleanup standards is the edge of the landfilled waste. Ground-water cleanup standards shall be attained throughout the contaminated plume excluding the area underneath the landfilled waste. This area of attainment includes areas outside of the landfill property as well as the area within the landfill property up to the landfilled waste.

As with the source control alternative described earlier, the ground-water alternatives include a number of common elements (with the exception of GW1 or "No-Action" Alternative). All four alternatives include:

- Institutional controls such as ground-water use and land use restrictions to prevent the use of contaminated ground water until ground-water cleanup standards are met.

- A ground-water extraction system designed to remove ground water that exceed PALs from the area of attainment and to prevent the further migration of contaminated ground water.

TABLE 5
GROUND-WATER CLEAN-UP STANDARDS

Chemical Organics:	Concentration in ppb:
Acetone	[a]
Benzene	0.067
Benzoic Acid	[a]
2-Butanone[b]	[a]
Carbon Te achloride	0.5
Chloroethan	[a]
1,1-Dichloroethane	85
1,2-Dichloroethane	0.05
trans-1,2-Dichloroethene	20
1,2-Dichloropropane	5[***]
Diethylphthalate	[a]
Ethylbenzene	272
2-Hexanone	[a]
Isophorone	[a]
4-Methyl-2-pentanone	[a]
Methylene Chloride	15
2-Methylphenol	[a]
4-Methylphenol	[a]
Naphthalene	[a]
Phenol	[a]
1,1,2,2-Tetrachloroethane	[a]
Tetrachloroethene	0.1
Tetrahydrofuran	10
Toluene	68.6
1,1,1-Trichloroethane	0.06
Trichloroethene	0.18
Vinyl Acetate	[a]
Vinyl Chloride	0.0015
m-Xylene	124
o&p-Xylene	124

[a] MCL or PAL not established.

[b] Also known as Methyl Ethyl Ketone (MEK)

[***] PAL not established. Clean-up standard is MCL

TABLE 5
GROUND-WATER CLEAN-UP STANDARDS

Chemical Organics:	Concentration Ground Water in ug/l:
Aluminum	200
Arsenic	5
Barium	0.2
Beryllium	1
Boron	[a]
Cadmium	1
Calcium	[a]
Chloride	125
Chromium	5
Cobalt	[a]
Copper	0.5
Cyanide	40
Fluoride	0.44
Iron	0.15
Lead	5
Magnesium	[a]
Manganese	25
Nickel	100
Nitrate	2,000
Potassium	[a]
Selenium	1
Silver	10
Sodium	[a]
Sulfate	125
Vanadium	[a]
Zinc	2,500

[a] MCL or PAL not established.

This system would be comprised of ground-water production wells. The number, production rate and location of these wells shall be established during the design of the remedial action.

The time required for alternatives GW2 through GW5 to achieve ground-water cleanup standards is determined by this common element of the alternatives, the ground-water extraction system. For the purpose of estimating the cost of the alternative, the FS assumed that the ground-water extraction system (and the system for treatment of extracted ground water discussed later in this section) would be operated for 20 years. The actual length of time that these systems will be operated will be determined by U.S. EPA, after review of ground-water contaminant data gathered during actual operation of the system.

Additional ground-water data and testing may be necessary to design the extraction system.

- A ground-water monitoring program designed to detect changes in concentration of hazardous constituents in the ground water and to detect the presence and concentration of site-related contamination in residential drinking water wells near the Site.

- Discharge of treated ground water to Badfish Creek. The discharge of treated ground water shall comply with surface-water discharge requirements of Chapters 102, 103, 104, 105, 106, 108 and 207 of the WAC. Discharge of treated water would occur "on-site" therefore, only the substantive portions of surface-water discharge requirements will need to be met. No Wisconsin Pollutant Discharge Elimination System (WPDES) permit will be required.

  Treatability testing on the extracted ground water may be necessary to design the treatment system.

The difference between ground-water Alternatives GW2 through GW5 is the type of treatment technology that would be utilized to treat the hazardous constituents in the extracted ground water prior to surface-water discharge.

Alternative GW1

Alternative GW1 is a "No-Action" Alternative. No measure would be taken to remedy ground-water contamination. However, State of Wisconsin regulations currently require a ground-water monitoring program at the landfill. This state-required ground-water

monitoring program may not necessarily be as broad as the ground-water monitoring program common to the ground-water alternatives described above.

An estimate has not been made on the length of time that it would take before the natural attenuation processes could reduce hazardous constituent concentrations to the ground-water cleanup standards. Significant ground-water contamination has occurred at this Site. Natural ground-water movement will result in the spread of ground-water contaminants.

The estimated costs for this alternative are:

Capital cost: $0
Operation and Maintenance (O&M) annual costs: $114,216
Net Present Value of Capital and O&M costs: $2,350,837

Alternative GW2

Alternative GW2 includes the common elements of the ground-water alternatives previously discussed and a treatment system for the extracted ground water that utilizes air stripping, activated carbon and catalytic oxidation.

The air stripping/activated carbon/catalytic oxidation treatment system components include an air stripping tower followed by activated carbon filtration units for effluent water polishing. Air emissions from the stripping tower would be treated by catalytic oxidation before discharge to the atmosphere. Pretreatment of the water, by precipitation, would likely be required for removal of metals and inorganic ions.

ARARs for this treatment system include state requirements for air discharges (Chapters NR 400-499 WAC) from the air tower; and for the spent activated carbon and precipitated metals, treatment, storage and disposal of hazardous waste (the NR 600 rule series). RCRA Land Disposal Restrictions (LDRs) is an ARAR if the spent activated carbon is land disposed instead of regenerated in a RCRA-compliant unit.

The estimated costs for this alternative are:

Capital cost: $2,707,500
O&M annual costs:
$1,514,659 for each of the first 20 years
$114,487 per year for an additional 20 years,
Net Present Value of Capital and O&M costs: $19,992,307

Alternative GW3

Alternative GW3 includes the common elements of the ground-water alternative previously discussed and a treatment system for extracted ground water that utilizes air stripping and activated carbon.

The air stripping/activated carbon treatment system components include an air stripping tower followed by activated carbon filtration units for effluent water polishing. Air emissions from the stripping tower would be treated with activated carbon before discharge to the atmosphere. Pretreatment of the water would likely be required for removal of metals and inorganic ions.

ARARs for this treatment system include state requirements for air discharges (Chapters NR 400-499 WAC) from the air tower; and for the spent activated carbon and precipitated metals, treatment, storage and disposal of hazardous waste-(the NR 600 rule series). RCRA LDRs is an ARAR if the spent activated carbon is land disposed instead of regenerated in a RCRA-compliant unit.

The estimated costs for this alternative are:

Capital cost: $2,062,500
O&M annual costs:
$1,071,859 for each of the first 20 years
$114,487 per year for an additional 20 years,
Net Present Value of Capital and O&M costs: $16,842,038

Alternative GW4

Alternative GW4 includes the common elements of the ground-water alternative previously discussed and a treatment system for extracted ground water that utilizes above-ground biological degradation.

The above ground biological treatment system components include a suspended growth (activated sludge) biological reactor, a settling basin for liquid separation and sludge handling facilities. A pretreatment phase for metals precipitation is anticipated.

ARARs for this treatment system include state requirements for air discharges (Chapters NR 400-499 WAC) from the biological reactor; and for sludge disposal and precipitated metals treatment, storage and disposal of hazardous waste- the NR 600 series rules. LDRs is an ARAR if the spent activated carbon is land disposed instead of regenerated in a RCRA-compliant unit.

The estimated costs for this alternative are:

Capital cost: $2,325,000
O&M annual costs:
$561,859 for each of the first 20 years
$114,487 per year for an additional 20 years,
Net Present Value of Capital and O&M costs: $10,301,833

Alternative GW5

Alternative GW5 includes the common elements of the ground-water alternative previously discussed and an extracted ground-water treatment system that utilizes chemical oxidation.

The FS evaluated a chemical oxidation treatment system that utilizes ultraviolet light as an energy source. This ultraviolet light chemical oxidation system would include flow equalization, a closed reactor vessel and a hydrogen peroxide feed system and/or ozone generator and catalytic converter, depending on the specific system and equipment selected. A pretreatment phase for metals precipitation is anticipated.

ARARs for this treatment system include state requirements for air discharges (NR 400-499) from chemical oxidation; and for the treatment, storage and disposal of hazardous waste- NR 600 for precipitated metals.

The estimated costs for this alternative are:

Capital cost: $1,807,500
Operation and Maintenance (O&M) annual costs:
$645,859 for each of the first 20 years
$114,487 per year for an additional 20 years,
Net Present Value of Capital and O&M costs: $10,926,379

J. Comparative Analysis of Alternatives: The Nine Criteria

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the relative performance of each alternative is evaluated using the nine criteria, Title 40 of the Code Federal Regulations (40 CFR) Section 300.430(e)(9)(iii), as a basis for comparison. An alternative providing the "best balance" of trade-offs with respect to the nine criteria is determined from this evaluation.

The following two threshold criteria; overall protection of human health and the environment, and compliance with ARARs, are criteria that must be met in order for an alternative to be selected.

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether a remedy eliminates, reduces, or controls threats to human health and to the environment.

The major exposure pathways of concern at the Site are the ingestion, inhalation, and contact with contaminated ground water and inhalation and contact with contaminated waste and soils.

Source control alternatives S2, S3 and S4 are protective of human heath and the environment by preventing direct contact with landfilled waste and minimizing water intrusion through the waste thus limiting leachate production and ground-water contamination. The landfill covers prevent direct contact with the landfilled waste.

Alternative S1 does not include a landfill cover. This alternative is not protective, since it does not minimize leachate production and ground-water contamination and direct contact with the waste. Since Alternative S1 does not satisfy this threshold criterion, it may not be selected as a remedy and will not be evaluated further.

Ground-water control alternatives GW2, GW3, GW4 and GW5 are protective of human heath and the environment by preventing the use of contaminated ground water while returning the aquifers to beneficial use by extraction and treatment of contaminated ground water. Since Alternative GW1 is not protective, since it does not prevent use of contaminated ground water and does not include remediation of ground water within a reasonable time. GW1 does not satisfy this threshold criterion, it may not be selected as a remedy and will not be evaluated further.

2. Compliance with Applicable or Relevant and Appropriate Requirements

This criterion evaluates whether an alternative meets ARARs set forth in federal, or more stringent state, environmental standards pertaining to the site or proposed actions.

Only Alternative S3 complies with the source control alternative ARARs (Chapters NR 504.07 and NR 660.16 WAC) for closure of the Site. Since Alternatives S2 and S4 utilize

landfill covers which do not comply with ARARs, they do not satisfy this threshold criterion, and may not be selected as a remedy, and therefore will not be evaluated further.

Ground-water Control Alternatives GW2, GW3, GW4 and GW5 appear capable of complying with ARARs. All four alternatives rely on an identical ground-water extraction system to attain ground-water cleanup standards. The four alternatives differ in the treatment system that would be employed. Each of the ground-water treatment systems are expected to be able to meet surface-water discharge, air discharge and waste management requirements.

The biological treatment system of GW4 may be susceptible to periodic exceedances of surface water discharge standards since variances in concentration of contaminants in ground water may cause drastic changes in the population of the bacteria used to treat the contaminants. The bacteria populations may not be able to change as quickly as the concentration of contaminants in extracted water.

3. Long-Term Effectiveness and Permanence

This criterion refers to the ability of an alternative to maintain reliable protection of human health and the environment over time (lower residual risk) once the cleanup goals have been met.

Alternative S3 includes the use of landfill covers designed to satisfy the requirements of closure of landfills containing solid waste and hazardous waste. The ARARs NR 504.07 and NR 660.16 require cover designs that are considered effective and reliable in the long term. By employing an in-situ vapor extraction and treatment system to portions of the waste mass, less contaminant mass will remain in the landfill, reducing threats posed by the landfilled waste.

Alternatives GW2, GW3, GW4 and GW5 differ only in the treatment system for extracted ground water. All four have the same ground-water extraction system therefore, all have the same degree of long-term effectiveness and permanence.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment.

This criterion evaluates treatment technology performance in the reduction of chemical toxicity, mobility, or volume. This criterion addresses the statutory preference for selecting remedial actions which include, as a principal

element, treatment that permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants.

Alternative S3 includes extraction and treatment of landfilled VOCs through vapor extraction and oxidation. These systems would permanently and significantly reduce the volume of VOCs in the landfill and permanently and significantly reduce the toxicity of the VOCs once treated.

Alternatives GW4 and GW5 provide on-site destruction of organic contaminants extracted from the ground water. The treatment systems employed would permanently and significantly reduce the toxicity of the contaminants recovered from the ground water.

Alternatives GW2 and GW3 transfer at least a portion of the organic contaminants from the ground water to activated carbon. The carbon must be regenerated by removing and destroying the contaminants, as opposed to disposal of the carbon and attached contaminants, for the toxicity of these contaminants to be considered permanently reduced.

5. Short-Term Effectiveness

Short-term effectiveness considers the time to reach cleanup objectives and the risks an alternative may pose to site workers, the community, and the environment during remedy implementation until cleanup goals are achieved.

Construction of Alternative S3's cover is estimated to take 6 months. The in-situ vapor extraction system is estimated to be operated for 5 years.

It is estimated that 12,692 10-cubic-yard truckloads of cover material will be needed. The transport of this material may pose some short-term impact on the community. These impacts include safety of persons sharing the roadway with trucks transporting site cover material, noise, debris and road damage. Impacts can be minimized by adherence to federal and state transportation requirements, use of suitable clays and soils found near the landfill, and adherence to reasonable and customary (as determined by U.S. EPA) County and Township roadway safety, cleanup and repair requirements.

Construction of the cover system involves significant earth-moving activities at the landfill. Construction hazards to workers will be minimized by using construction worker safety practices.

Alternatives GW2, GW3, GW4 and GW5 have the same short-term effectiveness due to their common ground-water extraction component. It is assumed, for the purposes of the FS, that ground-water extraction and treatment will be operated for 20 years.

6. Implementability

This criterion considers the technical and administrative feasibility of implementing an alternative.

Alternative S3's landfill cover is considered implementable utilizing proven designs and construction techniques. The in-situ vapor extraction and treatment systems have been used at other sites and are considered implementable.

Alternatives GW2, GW3, GW4 and GW5 utilize technologies that have been previously installed and operated. Alternative GW 5 utilizes a technology that has a shorter record of installation.

U.S. EPA does not anticipate any problems securing access to property needed to implement the alternatives.

7. Cost

This criterion compares the capital, O&M, and present worth costs of implementing the alternatives at the Site.

The costs for the eligible source control alternative are:

Alternative	Capital Cost	Annual O&M Cost yrs 1-5 / 5-30	Net Present Value
S3	$3,379,566	$90,978 / $21,258	$3,925,008

The costs for the eligible ground-water alternatives are as follows:

Alternative	Capital Cost	Annual O&M Cost yrs 1-20 / 20-40	Net Present Value
GW2	$2,707,500	$1,514,659 / $114,487	$19,992,307
GW3	$2,062,500	$1,071,859 / $114,487	$16,842,038
GW4	$2,325,000	$561,859 / $114,487	$10,301,833
GW5	$1,807,500	$645,859 / $114,487	$10,926,379

Calculation of Net Present Value is an estimate of the value of money used to pay future costs in "today's" dollars. The calculation is based on the assumption that an existing dollar will earn interest and therefore has a greater value than a future dollar.

8. State Acceptance

No formal notification of State concurrence has been received at the time of ROD signature. The WDNR is expected to concur with U.S. EPA's decision on the selected remedy.

9. Community Acceptance

Community concerns have been reviewed and are addressed in the attached Responsiveness Summary.

J. Selected Remedy

Based upon considerations of the requirements of CERCLA and the NCP, balancing of the nine criteria, and public comment, U.S. EPA has determined that Alternatives S3 and GW5 create the most appropriate remedy for the Site.

This determination is based on:

- Alternative S3 is the only source control alternative reviewed that complies with ARARs.
- Alternative GW5 strikes the best balance of the evaluation criteria. GW5 offers: expected reliability on continual attainment of surface-water discharge standards, "on-site" destruction of contaminants, and the net present value is second lowest of eligible alternatives.

The components of the selected remedy are:

- A landfill gas control system designed and operated to comply with Chapter NR 506.08 WAC and state air-discharge standards to control landfill gas.
- Institutional controls including deed restrictions limiting the land use of the landfill and landfill property, and ground-water use restrictions.
- An in-situ vapor extraction and treatment system to remove VOCs from landfill Cells 6 and 12.

- An air intrusion cut-off wall, to reduce the amount of air from being drawn laterally into Cells 6 and 12 during operation of the vapor extraction system.

- A landfill cover designed to comply with Chapter NR 504.07 WAC over the entire landfill and designed to comply with Chapter NR 660.16 WAC over Landfill Cells 6 and 12.

- A ground-water extraction system designed to (a) remove ground water that attains or exceeds the ground-water cleanup standards set by this ROD, see Table 5, from the area of attainment, and (b) prevent the further migration of contaminated ground water. Once the ground-water cleanup standards are achieved the continued operation of all of or portions of the ground-water extraction system may be required to maintain concentrations of hazardous constituents below the ground-water cleanup standards.

  During operation of the ground-water extraction system, U.S. EPA may make modifications to the system or system's operation. These modifications may include any or all of the following:

  - at individual wells where cleanup standards have been attained, pumping may be discontinued;

  - alternating pumping at wells to eliminate stagnation points;

  - pulse pumping to allow aquifer equilibration and to allow adsorbed and or absorbed contaminants to partition into ground water; and

  - installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

  To ensure that cleanup standards continue to be maintained, the ground water will be monitored at those wells where pumping has ceased. These wells shall be sampled and ground water analyzed a minimum of once a year following discontinuation of pumping.

- A chemical oxidation or other comparable technology treatment system to treat extracted ground water to comply with surface-water discharge, air emission and waste management standards and requirements.

  U.S. EPA will decide when a technology is comparable to chemical oxidation. The bases for the decision would

include, but not be limited to, (a) effectiveness, (b) implementability, and (c) cost as described at 40 CFR 300.430(e)(7)(i).

- Discharge of treated water to Badfish Creek.

- A ground-water monitoring program designed to detect changes in concentration of hazardous constituents in the ground water and to detect the presence and concentration of site related contamination in residential drinking water wells near the Site.

  The ground-water monitoring program shall continue for 30 years after the attainment of the ground-water cleanup standards.

  Residential well sampling and analysis for Tetrahydrofuran, Target Analyte List (TAL) analytes, and Target Compound List (TCL) analytes shall occur at a minimum frequency of twice a year.

  Residential well sampling shall commence as soon as possible. Residential well sampling shall be conducted during design of the remedy, using standard drinking water well sampling and analytical procedures until site specific procedures are approved by U.S. EPA.

  U.S. EPA shall select residential wells nearest the Site for sampling and analysis during the remedial design until a list of residential wells is approved by U.S. EPA for long-term monitoring.

The estimated total Net Present Value for the selected remedy is $14,851,387.

K. Statutory Determinations

Under its legal authorities, U.S. EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws (ARARs) unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that

employ treatment as a principle element that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances. The following sections discuss how the selected remedy meets these statutory requirements.

1. Protection of Human Health and the Environment

The selected remedy protects human health and the environment by combining source containment, source removal, and remediation of contaminated ground water.

Source containment will be implemented by covering the landfill waste. This cover minimizes production of leachate within the landfill thus reducing leachate contamination of ground water. The landfill cover will also prevent direct contact with site contaminants. Landfill gas control measures will minimize the risks posed by landfill-generated gases.

Source removal will be accomplished by utilizing vapor extraction and treatment. The vapor extraction system will remove VOCs from the waste for treatment, which will also reduce the VOCs' toxicity.

The remediation of ground water will stop the migration of contaminants in the ground water and reduce the concentration of ground-water contaminants to below health based levels.

The selected remedy will reduce all site related risks to the acceptable risk ranges of 1×10^{-4} to 1×10^{-6} for excess lifetime cancer risk and a hazard index of < 1 for non-carcinogenic risks.

Short-term risks posed by construction at the Site and operation and maintenance of the remedy components can be controlled by the adherence to transportation and construction safety practices.

2. Compliance with ARARs

The selected remedy will comply with the federal and more stringent state ARARs listed below:

a. Chemical Specific ARARs

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of cleanup at a site.

i. Surface Water

Federal ARARs

Surface water quality standards for the protection of human health and aquatic life were developed under Section 304 of the Federal Water Pollution Control Act, 33 U.S.C. §§ 1251 to 1387. The Federal Ambient Water Quality Criteria (AWQC) are nonenforceable guidelines that set pollutant concentration limits to protect surface waters. The AWQC are applicable to point source discharges, such as from industrial or municipal waste water streams.

State ARARs

The State has promulgated Wisconsin Water Quality Standards and Criteria (WWQC) under Chapters NR 102, NR 103, and NR 105 WAC, and the procedures for calculating the toxic effluent limits under Chapter NR 106 WAC, based on the Federal AWQC developed by U.S. EPA. Chapters NR 104, NR 108, and NR 207 WAC, also apply in determining water quality based limits. The State WWQC and the anti-degradation standards in Chapter NR 207 WAC, are applicable if contaminated ground water from the Site is pumped, treated and discharged into the wetlands or a surface water body.

The State is authorized to implement the National Pollutant Discharge Elimination System (NPDES) program. The applicable or relevant and appropriate requirements for discharge of treated water are dependent on the point of discharge. The procedural requirements of a Wisconsin Pollutant Discharge Elimination System (WPDES) permit, under Chapter NR 220 WAC, do not apply to the discharge of water into a surface water body at the Site, since the discharge point into Badfish Creek is considered "on-site." Subject to the approval of U.S. EPA, effluent limits for surface water discharge will be established by the WDNR. Chapter NR 220 WAC requires that the effluent limits be based on the application of best available technology (BAT) prior to discharge.

ii. Air Emission Standards

Federal ARARs

The Clean Air Act, 42 U.S.C. Section 7401, et seq., is applicable to any off-gases produced by the gas control system, vapor treatment, or ground water treatment systems.

State ARARs

Chapter NR 445 WAC, provides air pollution control standards and is applicable to any off-gases produced by the gas control system, vapor treatment, or ground water treatment systems.

iii. Land Disposal Restrictions

Federal ARARs

The Land Disposal Restrictions, 40 CFR Part 268, are applicable to treatment residuals which are RCRA-characteristic under the Toxicity Characteristic Leaching Procedure (TCLP) and will be disposed on land.

State ARARs

Chapter NR 675.20 WAC, provides land disposal restrictions treatment standards that are applicable for treatment residuals which are RCRA-characteristic under the TCLP and will be disposed on land.

iv. Ground water

Ground-water Quality Standards

The State is authorized to administer the implementation of the Federal Safe Drinking Water Act, 42 U.S.C.A. §§ 300f to 300j-26. The State has promulgated ground-water quality standards in Chapter NR 140 WAC, which, according to WDNR, are consistently applied to all facilities, practices, and activities regulated by WDNR and which may affect ground-water quality in the state. Chapter 160, Wis. Stats., directs WDNR to take action to prevent the continuing release of contaminants at levels exceeding standards at the point of standards application. Ground-water quality standards established pursuant to Chapter. NR 140 WAC, are known as preventive action levels (PALs).

PALs contained in Chapter NR 140.10 WAC, are generally more stringent than corresponding federal standards and are therefore applicable to the Site.

The point of compliance for the ground-water cleanup standards, or PALs, is the boundary of the landfill waste. U.S. EPA established this as the point of compliance for CERCLA response actions on page 8753 of the preamble for the NCP published in the Federal Register on March 8, 1990, "...remediation levels should generally be attained throughout the contaminant plume, or at and beyond the edge of the waste management area, when waste is left in place."

The implementation of the selected remedy at the Site will comply with Chapter NR 140 WAC, in that PALs will be met in the ground water. These standards, in accordance with the NCP, will be met at the boundary of the landfill waste.

b. Location-specific ARARs

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

i. Federal ARARs

Executive Order No. 11990 - Wetlands Protection - is applicable for this site if treated leachate and ground water is discharged to wetlands.

Section 404 of the Federal Water Pollution Control Act regulates the discharge of dredge or fill material to waters of the United States. Construction of surface water discharge points may be regulated under Section 404; therefore, the substantive requirements of Section 404 are relevant and appropriate to the remedial action if the discharge of treated ground water is to wetlands or a surface water body.

ii. State ARARs

Chapter NR 115 WAC, (Wisconsin's County Shoreland Protection Program), Chapter NR 1.95 WAC, (Wetlands Preservation, Protection, and Management), and Chapter NR 103 WAC (Water Quality Standards for Wetlands) are applicable to this

remedial action if treated leachate is discharged to wetlands, if any structure is built or any fill is placed in a wetland area, or if any construction is performed in a shoreland area.

c. Action-specific ARARs

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

i. Landfill Contents

Federal ARARs

RCRA Subtitle D requirements are relevant and appropriate for landfill closure because the majority of waste placed in the landfill was municipal waste. The current cap on the landfill does not meet RCRA Subtitle D requirements for closure of a solid waste landfill.

RCRA Subtitle C requirements are relevant and appropriate for closure of landfill Cells 6 and 12. The waste disposed in these two cells was similar or identical to RCRA hazardous waste and appears to be the major contributor to ground-water contamination.

RCRA Land Disposal Restrictions are applicable to any treatment residuals from the landfill determined to be a RCRA-characteristic waste and will be disposed on land.

The solid waste disposal requirements of 40 CFR Part 257 are applicable to disposal of solid waste associated with this remedial action.

Federal regulations at 40 CFR Section 264.310, regarding post-closure care to ensure that the Site is maintained and monitored, are also relevant and appropriate.

State ARARs

Chapter NR 30 WAC regulates dredging, relocation, enlargement, grading and structures in or near navigable waters of the state. These statutes would be applicable for any structures built in or near a surface water body. Such structures may be needed at the Site for discharge of treated leachate.

The discharge of waste water (treated ground water) to the land or surface waters; effluent limits; discharge permits; and sampling/testing methods are regulated by Chapter 147, Wis. Stats. (Pollution Discharge Elimination), Chapters NR 102, NR 103, NR 104, NR 105, NR 106, NR 108, NR 207, and NR 220 WAC. These requirements are all applicable to the discharge of treated ground water to wetlands or a surface water body. Chapter NR 220 WAC, provides that no discharge shall contain quantities of listed pollutants greater than that would remain after subjecting the water to best available technology economically achievable (BAT).

Wisconsin's Solid and Hazardous Waste Programs are regulated by Chapter 144, Wis. Stats. The Solid Waste regulations are found at Chapters NR 500 to NR 520 WAC. These regulations are relevant and appropriate at this site.

Chapters NR 504.07, NR 506.08(3), NR 514.07, and NR 516.07 WAC (Landfill Capping and Closure Requirements), are relevant and appropriate at this site. The cover system contained in the selected remedy is necessary to abate and prevent exceedence of the ground-water standards found in Chapter NR 140, WAC.

Chapter NR 508 WAC (Landfill Monitoring Requirements), is relevant and appropriate to this site for the long-term ground water monitoring contained in the selected remedy.

Chapters NR 504.04(4)(e) & (f), NR 506.07(3), and NR 508.04(2) WAC are relevant and appropriate to this site for controlling explosive gas migration levels and for soil gas monitoring. Chapter NR 506.08 WAC, which regulates active gas extraction systems that collect and combust landfill gas, is relevant and appropriate for this site.

Chapter NR 506.08(3)(b) WAC regulates storm water runoff and is relevant and appropriate to this site.

Chapter NR 504.05 WAC is relevant and appropriate for this site because it provides the minimum design criteria for all aspects of the remedial measures.

Chapter NR 660.16 WAC, is relevant and appropriate for the hazardous waste landfill cover design over Cells 6 and 12.

Chapters NR 400 to NR 499 WAC provides air pollution control standards that are applicable to any off-gases produced by the gas extraction system or waste water treatment system at the Site.

Chapter NR 141 WAC regulates the installation of ground water monitoring wells. Chapter NR 112 WAC regulates the installation and operation of extraction wells. Both of these provisions are relevant and appropriate to the remedial action.

Chapter NR 149 WAC regulates the State's laboratory certification program. This requirement is applicable to any analytical testing performed at the Site.

3. Cost Effectiveness

The selected remedy for this site is cost effective because it provides the best overall effectiveness proportional to its costs in comparison to the other alternatives evaluated.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized for management of the landfill waste and remediation of the contaminated ground water at this site. The selected remedy provides the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost, while considering the statutory preference for treatment as a principal element and state and community acceptance.

The selected remedy for the Site will significantly reduce the inherent hazards posed by the waste mass by covering the landfill, extracting and treating VOCs from the landfill waste in Cells 6 and 12, and controlling landfill gas. The remedy will significantly reduce risks posed by contaminated ground water by remediating the ground water through extraction and treatment.

5. Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for treatment as a principal element of a remedy. This statutory preference is satisfied by extracting and treating VOCs, which are considered the principal threat waste in the landfill, and by treating ground water contaminants.

CITY DISPOSAL CORPORATION LANDFILL

RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to meet the requirements of Sections 113(k)(2)(B)(iv) and 117(b) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), which requires the United States Environmental Protection Agency (U.S. EPA) to respond "...to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on a proposed plan for remedial action. The Responsiveness Summary addresses concerns expressed by the public, Potentially Responsible Parties (PRPs), and governmental bodies in the written and oral comments received by the U.S. EPA and the State of Wisconsin regarding the proposed remedy for the City Disposal Corporation Landfill Site (the Site).

A. Overview

The selected alternative for the Site:

> Landfill Gas Control System, Institutional Controls, In-situ Vapor Extraction System, Air Intrusion Cut-off Wall, Landfill Cover, Ground-Water Extraction System, Chemical Oxidation Treatment of Extracted Ground Water, Discharge of Treated Water to Surface Water and Ground-Water Monitoring.

The selected remedy was identified in the Feasibility Study (FS) Report dated March 24, 1992 as Alternative VI for source control and Alternative 10 for ground-water control; and in the Proposed Plan dated May 1992 as Alternative S3 for source control and Alternative GW5 for ground-water control. U.S. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, U.S. EPA has determined that no significant changes to the remedy, as originally identified in the Proposed Plan for this site, are necessary.

B. Background on Community Involvement

The Remedial Investigation (RI) Report, FS Report and the Proposed Plan for the Site were made available to the public for comment on May 14, 1992. These documents are available in both the administrative record and an information repository maintained at U.S. EPA offices in Chicago, Illinois, and the Dunn Town Hall (near the Site) at 4156 County Trunk Highway B, McFarland, Wisconsin.

A notice of availability of the administrative record and Proposed Plan was published in the Wisconsin State Journal, Madison Capital Times, and Stoughton Courier-Hub newspapers on May 14, 1992. A public comment period on the Proposed Plan was held from May 18, 1992, to July 20, 1992. In addition, a public meeting was held on June 3, 1992. At this meeting, representatives from U.S. EPA and WDNR answered questions about problems at the Site and the remedial alternatives under consideration. Comments received during this period are included in this Responsiveness Summary.

C. Summary of Comments Received and Agency Responses

The public comments regarding the Site are organized into three categories:

- Summary of comments from the community;
- Summary of comments from PRP for the Site;
- Summary of comments received from WDNR.

Many of the comments below have been paraphrased in order to effectively summarize them in this document. The Administrative Record contains copies of written comments submitted during the public comment period and a written transcript of the public meeting held on June 3, 1992. The written transcript includes the oral comments received during the formal comment segment of that meeting.

Community Comments

1. Comment Several comments were received requesting sampling and analysis for Volatile Organic Compounds (VOCs) at every private drinking water well near the Site in all directions beginning immediately and continuing monthly until the cleanup is complete.

   Response The selected remedy requires sampling and analysis of residential wells near the Site for chemicals listed on the Target Analyte List (TAL), Target Compound List (TCL) and tetrahydrofuran, at a minimum frequency of twice a year. The purpose of this sampling and analysis is to detect the presence and concentration of site-related contaminants in residential wells.

   U.S. EPA, in consultation with WDNR, will select individual residential wells in order to insure that all residential wells potentially threatened by site contamination will be protected.

The analytes (chemicals each sample will be analyzed for) are on standard lists known as the TAL and TCL (with the addition of tertrahydrofuran). These lists include all chemicals detected at the Site (including VOCs) as well as additional hazardous constituents.

The minimum testing frequency of twice a year is considered protective of human health based on the known velocity of ground-water movement. The ROD language allows U.S. EPA to increase the frequency of residential well sampling and analysis should additional information indicate that more frequent testing is necessary.

The ROD requires residential well sampling and analysis as soon as possible. Residential wells will be sampled and analyzed during the remedial design using standard drinking water well sampling and analysis procedures until site-specific procedures are approved. U.S. EPA will select residential wells nearest the Site for sampling and analysis during the remedial design until a list of residential wells is approved by U.S. EPA for long-term monitoring.

2. Comment One comment was received requesting identification of the criteria that would be used to determine which residential wells would be sampled and analyzed.

Response Specific written criteria for the identification of residential wells subject to sampling and analysis are not available. U.S. EPA will exercise its best professional judgement based upon a review of site geology, velocity of ground-water movement, location of ground-water monitoring wells, and location of residential wells in order to determine which residential wells should be sampled.

3. Comment One comment was received requesting replacement of contaminated wells with safer, deeper wells should an existing residential well become contaminated.

Response U.S. EPA has the authority to provide alternate drinking water sources to residences with drinking water wells contaminated by the Site in excess of certain health-based criteria.

Actions that U.S. EPA can consider taking a variety of actions to address contaminated residential water wells. these actions include: replacing the well; providing bottled water; and installing water filters. Specific language in the ROD is not necessary in order to allow U.S. EPA to address contaminated residential wells. The specific action that will be taken is determined by U.S. EPA based on the

specifics of the site and affected well.

4. Comment One comment was received requesting that the ground water be monitored during the estimated ground-water cleanup duration of 40 years.

Response The ROD requires ground-water monitoring to continue 30 years after attainment of ground-water cleanup standards. Landfill waste will be left in place as a result of this remedy. This waste could continue to adversely affect the ground water, even after ground-water standards are attained. A significant time period, 30 years, of additional ground-water monitoring is necessary to assure that ground-water cleanup standards continue to be attained at the Site.

In the event that ground-water cleanup standards are exceeded after an initial determination that ground-water standards have been attained, the ground-water treatment remedy will be re-activated. The ground-water pump and treat system will operate until ground-water cleanup standards are attained once again.

It is estimated that it will take 40 years to attain ground-water cleanup standards. The ROD requires an additional 30 years of ground-water monitoring after the standards are met. Thus, the ROD includes a duration of ground-water monitoring longer than that requested by the comment.

5. Comment Reduce the number of truck loads needed to cover the landfill by requiring the use of on-site material from adjacent land.

Response The selected remedy allows the use of available material from adjacent land. During the remedial design, the use of suitable material from on-site and adjacent sources will be evaluated. The landfill cover design will take into consideration the need to reduce the number of truck loads of cover material to the maximum extent practicable, while complying with the requirements of WDNR solid waste landfill and hazardous waste landfill regulations.

6. Comment Several comments were received requesting that damage to township roads resulting from construction of remedy components be repaired after construction at the Site.

Response Damage to township roads resulting from construction of the remedy may occur.

Superfund money may not be used for community improvements. However, it is customary for parties conducting large scale construction activities to repair road damage caused by construction. As long as requested repairs are reasonable and customarily required of any party causing such damage, U.S. EPA will ensure that township roads are repaired.

7. Comment Several comments were received requesting that traffic control and public safety measures be required for the increased truck traffic, ensuring protection of area residents during the construction of the remedy components.

Response The transportation of material for the remedy is required to comply with all applicable federal and state transportation requirements. The necessity of additional safety measures, such as additional signs, designated truck routes, and truck turning lanes, will be evaluated during design of the remedy.

8. Comment Two comments were received requesting that U.S. EPA provide for control of dust and associated exposure to dust-borne contaminants during construction of the cover and transport of material. One commenter requested that these control measures include paving a portion of the entrance road at the Site with asphalt (at least for residences near the entrance) and regular watering of the remainder of the access road to prevent dust.

Response Dust control during construction is a normal construction practice. Remedial design plans will include dust control measures. The specific manner in which dust control will be accomplished will be determined during remedial design. The decision to pave the access road, or some portion of it, would be part of this determination.

9. Comment Two comments were received requesting that the water level of nearby Hook Lake be monitored before and during remedial action to ensure that the ground-water extraction system does not alter lake water levels or that site contaminants do not migrate to the lake.

Response U.S. EPA agrees that it is important that site remedy activities do not adversely impact Hook Lake. The selected remedy requires extraction of ground water from the Site vicinity. The location of extraction wells and pumping rates will be determined during remedial design. At that time, U.S. EPA will be able to determine whether monitoring at Hook Lake is necessary, based on the design of the extraction system. If such monitoring is necessary, it will be incorporated into the design.

Based on the Remedial Investigation data, site contaminants have not migrated to Hook Lake. The contaminated ground water does not extend as far as Hook Lake. Also, the direction of ground-water movement from the Site is not toward Hook Lake. If during remedial design, it appears that monitoring of Hook Lake for site contaminants becomes necessary, it will be incorporated into the design.

10. Comment One comment was received requesting the immediate capping of Landfill Cells 6 and 12 to stop the increase of ground-water contamination from the known hazardous waste cells, rather than continuing the contamination for the next two years before capping. Another similar comment was received requesting that the landfill covers be installed as an expedited phase and the ground-water cleanup to be secondary.

Response U.S. EPA agrees with the commenters that the completion of design and installation of the landfill cover does not need to wait for the installation of the ground-water cleanup systems.

The landfill covers cannot be installed immediately, however, since these covers need to undergo engineering design. U.S. EPA expects to begin design of the landfill covers and the ground-water extraction and treatment system simultaneously. The design of the landfill covers is less complex than design of the ground-water extraction and treatment systems. It is possible to complete the design of the landfill covers before completing the ground-water extraction and treatment system design. Actual construction of the landfill covers may begin prior to completion of the remainder of the remedy's design. U.S. EPA will structure the design of the total remedy to allow construction of the landfill covers to begin as soon as possible.

11. Comment One comment requested the frequent monitoring of air quality during the implementation of the treatment systems for the ground water, vapor extraction system, and landfill gas control system.

Response The ROD requires that air emissions from the remedy components meet federal and state statutes and regulations on air emissions. Air monitoring of these systems' components will be conducted during the implementation of the remedy. The remedial design will include plans for air monitoring, including frequency.

12. Comment One comment was received requesting that U.S. EPA provide information on how this site's hazards rank with other sites in Wisconsin and nationally.

Response The Site is listed on the National Priorities List (NPL). U.S. EPA does not formally rank sites on the NPL according to severity of risk.

In the ROD, U.S. EPA determined that "Actual or threatened releases of hazardous substances from this site, if not addressed by implementation of the response action selected by this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment." This determination is based on RI and risk assessment data that indicate the Site poses unacceptable risks to human health and the environment. This determination is the rationale for taking remedial action at the Site.

13. Comment One comment was received requesting information on the geology and hydrology of the Site in addition to the information provided in the Proposed Plan.

Response An extensive investigation into the geology and hydrology of the Site and vicinity was conducted as part of the RI. In depth summaries on the geology and hydrology of the Site and vicinity are included in the RI Report, dated January 13, 1992. This report is available at the Dunn Town Hall, 4156 County Trunk, Highway B, McFarland, Wisconsin as well as at WDNR's Southern District office and U.S. EPA's Chicago office.

14. Comment One comment was received inquiring if trees in the wooded area near the landfill would be removed as a result of the remedy.

Response Some trees near the Site may be removed as a result of the remedy. The extent of tree removal will be determined during the remedial design. Trees may be removed to install the landfill covers, fencing, and other systems. Trees may also be removed to allow access to suitable cover material on land adjacent to the landfill. The majority of the land surrounding the landfill is owned by Waste Management of Wisconsin, Inc., the owner of the landfill.

15. Comment One comment was received requesting information, in addition to information provided in the Proposed Plan, concerning the impact on wildlife from the Site.

Response The remedial investigation included a risk assessment of the ecological impact of the Site. The risk assessment concluded that, based on the available data, no adverse effects to plants, soil organisms and livestock are expected. Plants and soil organisms are indicator species for affects of the Site on wildlife.

16. Comment One comment was received requesting that the Madison Metropolitan Sewerage District be kept informed of discharge rates and effluent quality of discharges to Badfish Creek. The information was requested because the District monitors Badfish Creek.

Response The designs, operation plans and operation record of the remedy will become public record. The information will be available to interested parties, including the District.

17. Comment One comment was received noting that the groundwater treatment process of the recommended remedy is quite complex. The comment requested that the long-term operational and maintenance needs of the remedy be specified in the remedial design.

Response The remedial design will include a detailed plan for the operational and maintenance needs of all components of the selected remedy.

Potentially Responsible Party Comments

18. Comment One comment was received requesting that the State ARAR requiring implementation of a ground-water pump and treat remedy at the Site be waived. The commenter requested the waiver permitted under the "inconsistent application of state requirements waiver," found in the NCP at 40 CFR 300.430(f)(1)(ii)(C)(5). The commenter alleged that the requirement for implementation of a ground-water pump and treat system is not consistently applied throughout the State.

Response U.S. EPA's decision requiring implementation of a ground-water pump and treat system is fully consistent with CERCLA Section 104(a)(1) and the NCP. A waiver of this requirement under 40 CFR 300.430(f)(1)(ii)(C)(5) is not appropriate for this site.

Congress has charged U.S. EPA with the responsibility of responding to releases of hazardous contaminants in order to protect human health and the environment. U.S. EPA follows applicable laws and regulations to accomplish this goal. The baseline risk assessment provides the basis for determining whether remedial action is necessary to protect human health and the environment. If contaminants of concern are listed in the baseline risk assessment as contributing to excess cancer risk outside an acceptable range of 1×10^{-4} to 1×10^{-6} or yield a hazard index ratio greater than one, remedial action is warranted. These criteria are set forth at 300.430(e)(2) of the NCP. The Site baseline risk assessment listed excess cancer risk as high as 2×10^{-2} and a hazard index ratio as high as 4,000. These values are clearly outside the acceptable NCP values. Therefore, remedial action and compliance with pertinent ARARs, under federal or more stringent state environmental laws, is required. Page 51434 of preamble to the proposed NCP, published in December 21, 1988 Federal Register, states "[W]herever ground water poses one of the principal threats at a site, the Superfund program will seek to pump and treat, if practicable."

Concentrations of some contaminants in ground water at the Site were measured many times over Maximum Concentration Limits (MCLs) promulgated by the federal Safe Drinking Water Act (SDWA). U.S. EPA has determined that the MCLs promulgated under the SDWA are ARARs for this site.

Therefore, U.S. EPA's decision to pump and treat ground water at the Site is based, in part, on exceedance of MCLs at the Site. This decision is also based upon U.S. EPA's goal of returning ground water to its beneficial use and the

Superfund program's preference for ground-water pump and treat technology to attain established cleanup standards.

Furthermore, U.S. EPA has determined that the inconsistent application of state requirements waiver is not appropriate. U.S. EPA believes that the amount of site-specific ground-water data at this site and the Stoughton City Landfill Site differs significantly. The Stoughton City Landfill Site requires further study, hence a decision has not yet been made regarding implementation of a ground-water pump and treat remedy. U.S. EPA believes that sufficient information exists about the nature and extent of ground-water contamination at the City Disposal Corporation Landfill Site supporting selection of ground-water extraction as a remedial technology.

These differences between the two sites justify selection of different remedies, and do not indicate an inconsistent application of state requirements.

19. Comment Two related comments were received requesting that U.S. EPA grant a "technical impracticability waiver" under 40 CFR 300.430(f)(1)(ii)(C)(3) for; (a) the State requirement to attain state health based ground-water cleanup standards of Chapter NR 140.10 Wisconsin Administrative Code (WAC), and (b) the State's requirement for the point of standards application at the waste boundary.

Response U.S. EPA has determined that it is inappropriate to grant a "technical impracticability waiver" under 40 CFR 300.430(f)(1)(ii)(C)(3) for the State requirement to attain the health-based ground-water cleanup standards of Chapter NR 140.10 WAC. Based upon information obtained during the RI and analysis of all remedial alternatives, U.S. EPA is confident that ground-water extraction and treatment has a high probability of success in terms of effectively withdrawing and removing ground-water contamination at the Site. This is particularly true for tetrahydrofuran (THF), a hazardous substance present in the ground water. THF is completely miscible in water and can travel throughout the aquifer with negligible retardation effects. In addition, there is no evidence demonstrating that ground-water extraction and treatment cannot restore the aquifer to cleanup standards. For these reasons, extraction and restoration of the contaminated ground water is considered technically feasible. Thus, the ARAR waiver for technical impracticability is inappropriate.

U.S. EPA acknowledges recent studies cited by Waste Management of Wisconsin, Inc. (WMWI) concerning the

effectiveness of groundwater extraction. These studies indicate a possible trend towards ineffectiveness of this technology in restoring contaminated aquifers within predictable time frames.

A guidance memorandum, "Considerations in Ground Water Remediation at Superfund Sites" OSWER Directive 9355.4-03, dated October 18, 1989, assessed the effectiveness of nineteen operating ground water extraction systems. The study demonstrated that ground water extraction systems effectively contained plumes and achieved significant mass removal of contaminants. In several instances, however, contaminant concentrations did not decrease linearly over time to reach desired remediation goals. After significant initial decreases, concentrations typically leveled off, often at concentrations higher than cleanup levels. WMWI also cites other studies which reach similar conclusions. These cases are site-specific and may involve variables not present at this site. Moreover, many cases did not demonstrate an inability to achieve specified goals. Thus, there is no evidence demonstrating that a ground-water pump and treat system cannot restore the aquifer at the Site to state cleanup standards.

The extraction system's ability to achieve cleanup standards throughout the plume cannot be determined initially. The extraction system must be implemented, modified as necessary, and plume response monitored over time. This includes the area in the immediate vicinity of the contaminants' source, where concentrations are relatively high. Therefore, U.S. EPA believes at this time that cleanup standards are achievable. Only after the system operates can a demonstration be made otherwise.

U.S. EPA has also determined that it is inappropriate to grant a "technical impracticability waiver" under 40 CFR 300.430(f)(1)(ii)(C)(3) for the State's requirement that the point of standards application (the point of compliance) be located at the waste boundary. Establishing the point of compliance as the waste boundary for ground-water cleanup standards is actually required by both the state requirement and a federal requirement, 40 CFR 300.430(f)(5)(ii)(A). Public notice of U.S. EPA's interpretation of that requirement is found on page 8753 of preamble to the Final NCP published in Federal Register on March 8, 1990. The regulation sets the point of compliance for ground-water cleanup standards as the waste boundary. Hypothetically, if a state were to set a point of compliance further away from the landfill, the state's requirement would be less stringent and therefore not an ARAR. 40 CFR 300.430(f)(5)(ii)(A) would then control, setting the point of compliance at the waste boundary.

20. Comment One comment received requested flexibility in the description of the selected remedy to allow an alternate extracted ground-water treatment technology. The comment suggested that the phrase "chemical oxidation or other comparable technology" be used to describe the selected remedy.

Response The description of the selected remedy includes the phrase "chemical oxidation or other comparable technology." The ROD description of this remedy component is as follows:

> A chemical oxidation or other comparable technology treatment system to treat extracted ground water to comply with surface-water discharge, air emission and waste management standards and requirements.
>
> The U.S. EPA will decide when a technology is comparable to chemical oxidation. The bases for the decision would include, but not be limited to, (a) effectiveness, (b) implementability, and (c) cost, as described at 40 CFR 300.430(e)(7)(i).

This language allows utilization of an alternate treatment technology should pre-design or design information indicate that an alternative to chemical oxidation treats extracted ground water more effectively. U.S. EPA will not approve, however, an alternate technology that is not protective of human health and the environment or that does not comply with ARARs.

21. Comment One comment was received stating that U.S. EPA's baseline risk assessment for the Site overestimated the health risks posed by the Site. The comment asserts that the risk estimates presented in the baseline risk assessment do not reflect true or reasonable estimates of site risks. The comment maintains that risk estimates prepared under current U.S. EPA risk assessment guidance are inflated, thus unnecessarily alarming the public and diverting attention from more important environmental problems. Furthermore, the comment suggests U.S. EPA consider using the results of a report entitled "Alternative Methodology Risk Assessment of the Groundwater Ingestion Pathway at the City Disposal Corporation Landfill", written for the commenter, in selecting an appropriate remedy for the Site. This report was submitted with the comment. The commenter feels that the methodologies in that report more accurately depict and quantify the risks at the Site, compared to U.S. EPA's approach. The report concludes, under its methodology, that no adverse health effects are expected from the Site if the

ground water was used as a drinking water supply.

Response The methods used by U.S. EPA in preparation of the baseline risk assessment are set forth in "Risk Assessment Guidance for Superfund, Volume I, Human Evaluation Manual," EPA/540/1-89/002, December 1989. U.S. EPA acknowledges that the assumptions used in these risk assessment methods are conservative. The underlying assumptions, however, are designed to be reasonable and not present a "worst case." These assumptions are conservative because the Superfund program designs each remedy to be protective of all individuals and environmental receptors that may be exposed at a site. Consequently, it is important to include all reasonably expected exposures in a risk assessment. U.S. EPA's risk assessment guidance focuses the assessment on realistic exposure scenarios. For example, the guidance provides that if, as in this case, adequate data identifying the center of the plume do not exist, ground-water modeling is not performed, and collection of additional samples is precluded, the well with the overall highest concentration of contaminants of concern is used as the exposure point concentration. At the Site, the well with the overall highest concentration of contaminants of concern was used as the exposure point concentration. This method is reasonable and does constitute an inflated risk because it is likely that the highest contaminant concentration has not yet been detected in sampling.

The guidance referenced above, fully supports regional interpretation of its procedures, as shown on page 6-27, "[s]election of the location(s) used to evaluate future groundwater exposures should be made in consultation with the RPM." Also, U.S. EPA Headquarters expects each U.S. EPA Region to determine the appropriate exposure area for use in calculating the exposure point concentration. Other U.S. EPA Regions have adopted similar guidance.

U.S. EPA has reviewed the results of the report entitled "Alternative Methodology Risk Assessment of the Groundwater Ingestion Pathway at the City Disposal Corporation Landfill" submitted by Waste Management of Wisconsin, Inc. (WMWI). U.S. EPA, however, cannot use these results, as suggested by the commenter, to determine whether remedial action is warranted at the Site. U.S. EPA is obligated to follow established agency policy, procedures, and guidance. Since the decision to take remedial action involves potentially significant financial liability for PRPs, U.S. EPA must follow established guidance and procedures. U.S. EPA will not disregard the existing baseline risk assessment. U.S. EPA will use the results of the baseline risk assessment already developed for the Site as justification for remedial action.

22. Comment One commenter requested that U.S. EPA grant a waiver from Chapter NR 507.07(4) WAC, (Wisconsin's solid waste landfill final cover system design requirements) allowing substitution of a synthetic membrane for compacted clay as the low hydraulic conductivity barrier in the cover system. The commenter stated that this waiver would allow construction of "Cover System A" across the entire site. The commenter requested the waiver under 40 CFR 300.430(f)(1)(ii)(C)(4) - "Equivalent Standard of Performance Waiver" and 40 CFR 300.430(f)(1)(ii)(C)(2) - "Greater Risk to Health and the Environment Waiver".

Response U.S. EPA has determined that a waiver of Chapter NR 507.07(4) WAC, is not appropriate for this site. The description of the final cover for the Site in the ROD does not specify the actual design of the landfill cover. Instead, the ROD simply identifies state landfill closure regulations that control design of the cover.

Chapter NR 507.07 WAC, includes a provision allowing approval of alternative materials, such as geomembranes, as part of the low hydraulic conductivity barrier, based on site-specific information. Chapter NR 504.07(b)(4) WAC reads:

> "CLAY CAPPING LAYER. A minimum 2 foot thick clay cap shall be designed to provide a low hydraulic conductivity barrier to percolation. Clay soil shall be used for this layer and shall meet the following specifications. The department may approve alternative material such as geomembranes based on facility specific information." (emphasis added)

This provision, allowing approval of alternate designs, provides U.S. EPA flexibility to approve a design incorporating a synthetic membrane. An alternate design could be approved if it can meet an equal degree of protection, level of performance and future reliability compared to the clay capping layer described in Chapter NR 504.07(b)(4) WAC. Therefore, a waiver allowing use of a synthetic membrane is not necessary.

The ROD requires a Chapter NR 504.07 WAC, landfill cover over the entire landfill. Twenty to thirty percent of the landfill cover must also comply with Chapter NR 660.16 WAC (Wisconsin's hazardous waste landfill cover design requirements). This portion of the landfill contains Cells 6 and 12, which accepted hazardous waste. For the reasons described in the ROD, Chapter NR 660.16 WAC, is the controlling ARAR for this portion of the landfill. Chapter NR 660.16 WAC requires a more substantial landfill cover

than Chapter NR 504.07 WAC. A landfill cover that complies with Chapter NR 660.16 WAC will, necessarily, also comply with Chapter NR 504.07 WAC. Therefore, waiver of Chapter NR 660.16 WAC for these portions of the landfill is also not appropriate.

23. Comment One comment received requested clarification of which state ARARs the landfill cover alternatives address.

Response The state ARARs for the landfill cover alternatives are Chapter NR 504.07 WAC, for the entire landfill and Chapter NR 660. 16 WAC, for Landfill Cells 6 and 12.

As described in Section J., Comparative Analysis of Alternatives: The Nine Criteria, of the ROD, only Alternative S3 successfully addresses these ARARs.

24. Comment One comment was received requesting that U.S. EPA define the expected performance criteria for each specific component, or layer, of the cover design described in the recommended remedy from the Proposed Plan.

Response The selected remedy in the ROD is the recommended remedy from the Proposed Plan (or Recommended Cleanup Plan).

The cover design of the selected remedy must comply with Chapter NR 504.07 WAC and Chapter NR 660.16 WAC, as described above for respective portions of the landfill.

These regulations include performance and design criteria. Rather than reproduce these regulations here, U.S. EPA refers the commenter to the actual regulations. These regulations are available at most legal and community libraries, as well as WDNR and U.S. EPA offices.

25. Comment One comment received indicated that one of the goals stated in the Proposed Plan "to restore the contaminated ground water to its beneficial use as a drinking water source by achieving state ground-water standards" is not the goal set forth in the Feasibility Study (FS) Report and is therefore misleading and inappropriate for the Site.

Response The goal stated in the Proposed Plan is consistent with goals in the FS Report. The PRP conducted the Feasibility Study, under an agreement with and under the direction of, U.S. EPA and WDNR. The PRPs wrote the FS Report, based on their own investigations and conclusions.

Page 147 of the FS Report states one objective, or goal, of the ground-water response action as "[R]ecover, to the maximum practical extent, ground-water contamination beyond the compliance area boundaries." The FS Report also contained statements concluding that achieving state ground-water cleanup standards at the point of compliance, the waste boundary, is "probably technically infeasible."

U.S. EPA disagreed with these conclusions and notified the PRPs of this position in a letter addressed to Waste Management Inc., dated April 20, 1992. In that letter, U.S. EPA informed the PRPs that U.S. EPA did not agree that ground-water cleanup was "probably technical infeasible." In the letter, U.S. EPA specified that the goal of remedial action at the Site is to restore the ground water to its beneficial use as drinking water. This letter was incorporated into the FS Report and clarified the goal of ground-water remedial action at the Site. Copies of this letter were attached to the front of each copy of the FS Report in the Administrative Record and information repository to ensure that the public was not misled about this goal.

Moreover, as discussed in the preamble to the NCP, on page 8753 of the March 8, 1990 Federal Register, U.S. EPA uses the Federal Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) or more stringent state standards as ground-water cleanup standards. In this case, Wisconsin's Preventative Action Limits (PALs) are the ground-water cleanup standard for the Site. In addition, these standards are applied at the waste boundary, in accordance with the NCP. Therefore, the standards set for the Site are consistent with U.S. EPA's interpretation of the NCP, which governs remedy selection.

26. Comment One comment received stated that WDNR possesses the statutory authority to grant exemptions to Enforcement Standards. The commenter proposed that WDNR exercise this "exemption authority," and change enforcement standards at the Site on the basis of technical impracticability.

Response It is WDNR's interpretation of Chapter s.160, Wis. Stats., that this statute does not give WDNR the authority to provide exemptions to health-based ground water standards, such as enforcement standards.

Wisconsin Department of Natural Resources Comments

27. Comment WDNR commented that secondary impacts and public safety concerns over increased truck traffic, required to transport landfill cover material, are significant. WDNR suggested that an alternate design to the design specified for Cover A (Alternative S2 in the FS Report) could substantially reduce the number of truck trips required for the landfill cover. WDNR's comment included a description of the alternate design.

Response U.S. EPA believes that the final design of the landfill cover should occur during remedial design, after issuance of the ROD. The selected remedy includes a landfill cover that is described by identifying the ARARs the design must meet. This will permit the flexibility necessary to design the best cover for the Site.

As previously discussed, seventy to eighty percent of the landfill will be covered with a cover that complies with state solid waste landfill cover regulations, Chapter NR 504.07 WAC. This regulation specifically allows WDNR to approve an alternate design. U.S. EPA can foresee a variety of cover designs that could minimize truck trips. These designs include; synthetic membranes (similar to the WDNR proposed cover), bentonite clay layers, use of additional fillers in on-site soils to produce clay-like soils, and other techniques. According to discussions with WDNR, the alternate design of the cover proposed by WDNR in its comments, could be approved by WDNR as an alternate design, complying with Chapter NR 504.07 WAC.

In summary, the design of the actual landfill cover is best determined during remedial design. U.S. EPA, in consultation with WDNR, will review proposed landfill cover designs for compliance with ARARs. U.S. EPA, in consultation with WDNR, will approve the actual landfill cover design during the remedial design. This cover design will meet the ARARs described in the ROD.